

Southern New Hampshire University

**Contemplating Climate Change:  
Changing the Culture of Climate**

A Capstone Project Submitted to the College of Online and Continuing Education in Partial  
Fulfillment of the Master of Arts in History

By

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Submitted May, 2019





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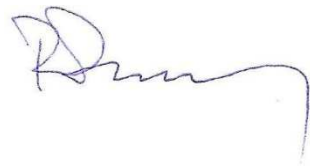
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## Abstract

*Contemplating Climate Change* is a proposed physical exhibit that intends to achieve the following goal: by exposing the public to the history surrounding air and water toxicity events, in addition to the history of greenhouse gas emissions, the exhibit will inspire people to believe in the reality of climate change and spur them to action. The information will be presented in the special exhibit space of the Smithsonian's National Museum of Natural History (NMNH) beginning the first week in January of 2021. The physical exhibit is intended to run for two years. Utilizing the digitization and mapping technology already in possession of the NMNH, *Contemplating Climate Change* will also be available online as a virtual tour. All images and artifacts included in this proposal have either been approved for use via the institution, paid for with subscription, or fall under the Fair Use doctrine of the United States which allows the use of copyrighted material for the intent of educational progress in nonprofit institutions such as Southern New Hampshire University and the Smithsonian's National Museum of Natural History.<sup>1</sup> Newspapers.com makes newspapers available for the purpose of historical research, which is the intention of their inclusion within this paper.<sup>2</sup> According to Getty images, their work can be included in this project stating, "Through the use of images, you can illustrate a concept, prove a point or inspire others to make their own works. Copyright law allows for creative expression in the classroom, and understanding that law can make it easier to share your ideas."<sup>3</sup>

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<sup>1</sup> "U.S. Copyright Office Fair Use Index," *Copyright.gov*, accessed 18 May 2019, <https://www.copyright.gov/fair-use/index.html>.

<sup>2</sup> "Account details," *Newspapers.com*, accessed 25 May 2019, <https://www.newspapers.com/account/>.

<sup>3</sup> "Copyright," *Getty Images*, accessed 25 May 2019, <http://wherewestand.gettyimages.com/copyright/#essentials>.

## **Dedication**

For Mother Earth and all life on this planet.

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## Introduction

In the past year climate change was denounced as fake from Twitter, the news, on the streets, in schools, and the White House. In the same year, books were published, studies generated, data mapped, models built, and lives reoriented around the evidence showing climate change was real. As two conflicting narratives arose stating the impossibility and the validity of the same phenomenon, two questions also emerged: What is the history of climate change and why doesn't anyone seem to know it? Through exploring historical air and water toxicity events combined with evidence on the invisible toxicity of greenhouse gas emissions, this dual physical and online exhibit will lead the public to conclude that climate change is real.

The scene was set in 1930. A disturbing trend emerged in various continents which changed the world's understanding of pollution. That year, the Meuse Valley Fog claimed the lives of sixty people in Belgium when industrial pollution was trapped by unexpected climate conditions.<sup>1</sup> Though not well known, "This episode led to the first scientific proof of the potential of for atmospheric pollution to cause deaths and disease, and it clearly identified the most likely causes."<sup>2</sup> According to historians, this was followed by a similar pollution event on July 8, 1943 in Los Angeles which was so sudden and agonizing that many were convinced they were being attacked by the Japanese.<sup>3</sup> Next there was the Donora, Pennsylvania (PA) smog event

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<sup>1</sup> Benoit Nemery, Peter H M Hoet, and Abderrahim Nemmar. "The Meuse Valley Fog of 1930: an air pollution disaster," *Lancet* 357, no. 9257 (March 3, 2001): 704, accessed 11 February 2017, [https://doi.org/10.1016/S0140-6736\(00\)04135-0](https://doi.org/10.1016/S0140-6736(00)04135-0).

<sup>2</sup> Nemery et al., "The Meuse Valley Fog of 1930," 704.

<sup>3</sup> Chip Jacobs and William J. Kelly, *Smogtown: The lung-burning history of pollution in Los Angeles* (New York, NY: The Overlook Press, 2008), 14.

of 1948 which claimed the lives of twenty people and left 7,000 more ill.<sup>4</sup> Finally, there was the Great Smog of London which hit in December of 1952, leaving 10,000 sickened and killing over 4,000 people.<sup>5</sup> Though the chemical makeup of each event differed, the overwhelming paradigm shift they caused was unified: air pollution was real and it was dangerous.<sup>6</sup>

However, the air was not the sole victim of human pollutants. Water toxicity events also began emerging in unfathomable ways. One of the most documented occurrences of aqueous pollution came from the oxymoronic Cuyahoga River fires of Cleveland, Ohio. The Cuyahoga River was considered the most industrially polluted river in the entire United States. By 1868, it was engulfed in flames a total of thirteen different times.<sup>7</sup> The worst of the blazes was in 1952 when over \$1.3 million worth of damages occurred. However, the nation was reluctant to address the pollution until the fire of 1969 where it was said the flames rose over five stories into the air.

For the most part, the public was fairly oblivious that pollutants were being "leached off" into our atmosphere and waterways. To them, the emissions from plants, factories, and mining endeavors were invisible. They would emerge as smoke and dissipate into the clear blue sky or they would spill into the water in vibrant displays, but downstream would run clear. Many were lulled into a false sense of security. How could such industrialization be detrimental if plants still grew, the water ran clean, and people breathed with ease? However, the 'invisible' began to manifest itself as throat-searing, eye-watering smog; some neighbors were rushed off to the

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<sup>4</sup> Devra Davis, *When Smoke Ran Like Water: Tales of Environmental Deception and the Battle Against Pollution* (New York, NY: Basic Books, 2004), 5-30.

<sup>5</sup> Davis, *When Smoke Ran*, 42-45.

<sup>6</sup> Davis, *When Smoke Ran*, 112.

<sup>7</sup> "Cuyahoga River Fire," *Ohio History Connection*, accessed 18 February 2019, [http://www.ohiohistorycentral.org/w/Cuyahoga\\_River\\_Fire](http://www.ohiohistorycentral.org/w/Cuyahoga_River_Fire).

hospital while others were led to the morgue. Fish floated unmoving to the surface and water became an inferno. The barrier was finally broken and pollution disasters became visible. The next step was for scientists to research as best they could to understand this new and pressing problem of pollution. Many recalled the “greenhouse effect” research done by scientists Svante Arrhenius and Guy Stewart Callendar back in 1896 and 1938, respectively, when they discovered that rising levels of Carbon Dioxide (CO<sub>2</sub>) released into the atmosphere could actually manipulate our environment.<sup>8</sup> Applying this theory to their present problem in the late 1940s, scientists such as Arie Haagen-Smit, looked into the elemental makeup of the smog in areas like Los Angeles where it was discovered that the primary contributor was CO<sub>2</sub> emissions from automobiles.<sup>9</sup> Near the end of World War II (WWII), there was a significant boom in automobile sales in which their production quadrupled.<sup>10</sup> More cars on the road meant more CO<sub>2</sub> in the air. As research continued, emerging trends led scientists back to the work of Arrhenius and Callendar to explore a more disturbing idea: What if the increased levels of CO<sub>2</sub> were also causing the temperature to rise? Shortly thereafter in 1957, scientists Roger Revelle and Hans Suess analyzed oceanic data based on the increase in CO<sub>2</sub> emissions and discovered that, due to

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<sup>8</sup> Svante Arrhenius, "On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground," *Philosophical Magazine and Journal of Science*, series 5, volume 14 (April 1896): 237-276, accessed 12 February 2017, [http://www.rsc.org/images/Arrhenius1896\\_tcm18-173546.pdf](http://www.rsc.org/images/Arrhenius1896_tcm18-173546.pdf).

Thomas R. Anderson, Ed Hawkins, and Philip D. Jones, "CO<sub>2</sub>, the Greenhouse Effect and Global Warming: from the pioneering work of Arrhenius and Callendar to today's Earth System Models," *Endeavour* 40, no. 3 (2016): 178-187, accessed 11 February 2017, <https://doi.org/10.1016/j.endeavour.2016.07.002>.

<sup>9</sup> Jacobs & Kelly, *Smogtown*, 69-74.

<sup>10</sup> Anderson et al., "CO<sub>2</sub>, the Greenhouse Effect."

the behavior of the greenhouse effect, the temperature of the earth was increasing at an extraordinary and exponential rate.<sup>11</sup> Climate change science had emerged.

This project is separated into five chapters. Chapter one is concerned with historical research. It delves into the validity and content of the primary source material used to inform and create the *Contemplating Climate Change* exhibit. Chapter Two contains the completed project with the resources and renderings of the physical exhibit space which will also be present in the online space. Chapter Three is devoted to the audience and contemplates how best to increase the base and ensure that all needs are met. The fourth chapter focuses upon the budget and staffing requirements of creating the exhibit. Finally, Chapter Five addresses recommendations for effective implementation of *Contemplating Climate Change*.

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<sup>11</sup> Roger Revelle and Hans Suess, "Carbon Dioxide Exchange Between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO<sub>2</sub> During the Past Decades," *Tellus* 1, no. 9 (February 1957): 18-27, <https://doi.org/10.1111/j.2153-3490.1957.tb01849.x>.

## Chapter 1: Historical Research

### I. Topic Interpretation

The research question guiding the development of this exhibit started broadly with, “What do we know about the history of climate change?” With extensive examinations stemming from comprehensive histories of climate change and some influence from news headlines, two smaller questions began to form: What caused the rise of CO<sub>2</sub> in the atmosphere and why did we create the *Clean Air Act* and the *Clean Water Act*?<sup>1</sup> The former led to the post-WWII automobile boom. However, that did not account for the increase in CO<sub>2</sub> prior to the 1940s. Hence a new question emerged: What caused the increase in greenhouse gases before auto emissions? The latter question, on the *Clean Air* and *Water Acts*, led to numerous forgotten and tragic air and water toxicity events that cost people their lives and highlighted the dangers of rolling back these policies in the present. On this front, another new query emerged: Why have all these toxicity events been forgotten to history? While these ideas continued to branch out in newer directions and validated the thesis that climate change is real, another very pivotal branch began to emerge from the trunk of environmental history: How do you persuade a climate change denier to change their mind? In public history, effective interpersonal communication is imperative because it is the job of the institution to bring factual knowledge to the public. Thus, some of the research conducted had to focus on appealing to the most oppositional audience.

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<sup>1</sup>Elizabeth T. Jacobs, PhD, Jefferey L. Burgess, MD, and Mark B. Abbott, PhD, “The Donora Smog Revisited: 70 Years After the Event That Inspired the Clean Air Act,” *American Journal of Public Health* 108 (2018): S85–88. <https://doi.org/10.2105/AJPH.2017.304219>.

Mark S. Joy, “THE MODERN ERA: Clean Water Act,” *Defining Documents: Environment & Conservation (1791-2015)*, April 2016, 134–38, <http://ezproxy.snhu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=khh&AN=127106083&site=eds-live&scope=site>.

The professional standards historians follow in selecting and interpreting sources are many. Of upmost importance, ethical historians will only utilize and present sources that are accurate and reputable.<sup>2</sup> Sources can be gauged for their accuracy by comparing them to multiple other accounts of the same events. Materials used for this exhibit have been counter-referenced and verified. For example, the information included in Rachel Carson's claims in *Silent Spring* can be confirmed with secondary data points surrounding the use of DDT and other insecticides.<sup>3</sup> Also, it is expected that sources are also be tested for validity by looking to peer reviews and the reputation of the authors. This has also been done for the sources of the exhibit. For example, Mike Hulme is the author of a pertinent secondary source called *Why We Disagree About Climate Change: Understanding Controversy, Inaction, and Opportunity*.<sup>4</sup> Hulme is a renowned Professor of Climate Change in the School on Environmental Sciences at the University of East Anglia in the United Kingdom. Beyond his academic expertise, Hulme was honored as writing one of the 'Top 20 most influential books' by Cambridge University Press for *Why We Disagree About Climate Change*'s influence on policy-making, contributions to social change, and alteration of the intellectual landscape.<sup>5</sup>

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<sup>2</sup> John Tosh, *The Pursuit of History: Aims, Methods and New Directions in the Study of History*, 6<sup>th</sup> ed. (Abington, Oxon: Routledge, 2015).

"NCPH CODE OF ETHICS AND PROFESSIONAL CONDUCT." *National Council on Public History*, accessed 9 February 2019, <https://ncph.org/about/governance-committees/code-of-ethics-and-professional-conduct/>.

<sup>3</sup> Rachel Carson, *Silent Spring* (Boston: First Mariner Books, 2002).

"DDT: Environmental Effects," *University of Delaware*, updated 19 November 1997, accessed 3 February 2019, <http://www1.udel.edu/chem/C465/senior/fall97/insecticide/envIRON.html>.

<sup>4</sup> Mike Hulme, *Why We Disagree About Climate Change: Understanding Controversy, Inaction, and Opportunity* (New York: Cambridge University Press, 2009), Kindle.

<sup>5</sup> "Why We Disagree About Climate Change ... top 20 influential books," *Mike Hulme*, 11 December 2014, accessed 3 February 2019, <https://mikehulme.org/why-we-disagree-about-climate-change-top-20-influential-books/>.

In addition to accuracy and reputability, it is important for historians to utilize works in an honest manner. This means that chosen sources are not manipulated, truncated, or bastardized in order to serve the larger argument. Instead, all sources will be represented in their full nature. For this exhibit, it is also necessary to address some of the more pertinent ethical considerations of displaying primary source artifacts. To begin with, the items within the collection shall be verified as authentic through their provenance which can be found in archival institutions, legally obtained without copyright infringement, pertinent to the mission of the National Museum of Natural History, and that do not violate the rights of any special interest groups by being displayed.<sup>6</sup> Furthermore, this exhibit will be created in such a manner that the goal of academic history is preserved: critical dialogue.<sup>7</sup> As stated by the American Historical Association, the purpose of historical research is to be, “in search of answers to the most compelling questions of our own time and place.”<sup>8</sup> Climate change is undoubtedly one of the most significant questions facing the world today. The dynamic display of this exhibit should spur critical conversations.

The secondary sources used for this project vary in nature. There are comprehensive histories such as, distinguished Professor of History and Director of the Ohio State Center for Historical Research, John L. Brooke’s *Climate Change and the Course of Global History: A Rough Journey*, which attempts to tell the entirety of all human factors contributing to climate

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<sup>6</sup> Timothy Ambrose and Crispin Paine, *Museum Basics*, 3rd ed. (New York: Routledge, 2012, c1993), 176-178.

<sup>7</sup> “Statement on Standards of Professional Conduct (updated 2019),” *American Historical Association*, accessed 18 February 2019, <https://www.historians.org/jobs-and-professional-development/statements-standards-and-guidelines-of-the-discipline/statement-on-standards-of-professional-conduct#SharedValues>.

<sup>8</sup> “Statement on Standards of Professional Conduct (updated 2019).”



change over time.<sup>9</sup> Such texts are beneficial because they show how Schumpeterian growth, defined as “...sustained modern economic growth based on accelerating technological innovation,” made significant impacts on the amount of greenhouse gases going into the atmosphere.<sup>10</sup> Along with similar works like Benjamin Lieberman and Elizabeth Gordon’s *Climate Change in Human History: Prehistory to the Present*, Mike Hulme’s *Why We Disagree About Climate Change: Understanding Controversy, Inaction, and Opportunity*, and J.R. McNeill’s *Something New Under the Sun*, these historians build a cohesive argument that each industrial revolution brought about exponential increases of greenhouse gas emissions which steadily affected the environment until the massive automobile boom in the post-WWII era.<sup>11</sup> That boom then increased environmental degradation to levels never before recorded. All of these sources come from reputable historians and supporting academics that hold offices in institutions around the world. The data included in their arguments is scientifically sound and can easily be quantified by known models such as the Keeling Curve.<sup>12</sup> The exhibit also utilizes

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<sup>9</sup> John L. Brooke, *Climate Change and the Course of Global History: A Rough Journey* (New York: Cambridge University Press, 2014).

<sup>10</sup> Brooke, *Climate Change*, 479-480.

<sup>11</sup> Mike Hulme, *Why We Disagree*.

Brooke, *Climate Change*.

Benjamin Lieberman and Elizabeth Gordon, *Climate Change in Human History: Prehistory to the Present* (New York: Bloomsbury Academic, 2018), Kindle.

<sup>11</sup> J.R. McNeill, *Something New Under the Sun* (New York: W.W. Norton & Company Ltd, 2001, c2000).

<sup>12</sup> “The Keeling Curve,” *Scripps Institution of Oceanography*, accessed 3 February 2019, <https://scripps.ucsd.edu/programs/keelingcurve/>.

the scientific writings of Arrhenius, Callendar, and Haagen-Smit.<sup>13</sup> These histories represent one-third of the primary exhibit space devoted to invisible pollutants and their causes. They build the case for climate change and the dangers of invisible toxins.

The second set of primary and secondary source material concerns past and present toxicity events and their resulting damages. This includes works surrounding the air toxicity events of Donora and Los Angeles as well as the water toxicity events of Cuyahoga and Rachel Carson's research into DDT. Some important books are Devra Lee Davis' *When Smoke Ran like Water: Tales of Environmental Deception and the Battle against Pollution* which chronicles air toxicity events, Chip Jacobs & William J. Kelly's *Smogtown: The Lung-Burning History of Pollution in Los Angeles* which showed the historical significance of air pollution in Los Angeles during the 1940s, Rachel Carson's *Silent Spring* which revealed the water pollution caused by insecticides, Elizabeth Kolbert's books *The Sixth Extinction: An Unnatural History* and *Field Notes from a Catastrophe: Man, Nature, and Climate Change* which chronicles the overreaching effects of climate change, and Thom Van Dooren's *Flight Ways: Life and Loss at the Edge of Extinction* which humanizes the pollution experience of other species.<sup>14</sup> Not all of these authors

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<sup>13</sup>Svante Arrhenius, "On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground," *Philosophical Magazine and Journal of Science*, series 5, volume 14 (April 1896): 237-276, accessed 19 March 2019, <https://doi.org/10.1080/14786449608620846>.

Michael Graham Richard, "Guy Callendar's groundbreaking scientific paper on man-made global warming is 75 years old," *treehugger*, written 23 April 2013, accessed 21 April 2019, <https://www.treehugger.com/climate-change/guy-callendars-groundbreaking-scientific-paper-man-made-global-warming-75-years-old.html>.

A. J. Haagen-Smit, "Chemistry and Physiology of Los Angeles Smog," *Industrial and Engineering Chemistry* 44, no. 6 (1952), 1342-1346, accessed 21 April 2019, <https://doi.org/10.1021/ie50510a045>.

<sup>14</sup> Jacobs & Kelly, *Smogtown*.

Davis, *When Smoke Ran*.

Carson, *Silent Spring*.

are historians. Some are medical professionals, journalists, and philosophers. However, all of them have strong reputations and respect in their fields and their research has been verified by other scientists and environmentalists. These narratives build another third of the exhibit space, the portion devoted to visible toxins. They depict the immediate death, destruction, and dangers of the visible pollutants we use daily. This section of the exhibit also includes primary source material like that of the Donora Smog Museum's archives have been digitized and given to me by Brian Charlton of the Donora Historical Society as well as photographs from the University of California at Los Angeles Archives.<sup>15</sup>

The third set of sources represents the final piece of the exhibit space: the audience. This is where the real interpersonal connection between public history institution and audience lies. Research for how to best appeal to the audience and present the materials comes from works such as David O. Renz & Associates *The Jossey-Bass Handbook of Nonprofit Leadership and Management, Fourth ed.*, Ross Parry's *Museums in a Digital Age*, Timothy Ambrose and Crispin Paine's *Museum Basics, 3rd ed.*, and Katharine Hayhoe's "The Most Important Thing You Can Do to Fight Climate Change: Talk About It."<sup>16</sup> These resources are the backbone to ensuring the

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Elizabeth Kolbert, *The Sixth Extinction: An Unnatural History* (New York: Picador, 2014).

Elizabeth Kolbert, *Field Notes From a Catastrophe: man, Nature, and Climate Change* (New York: Bloomsbury, 2006).

Thom Van Dooren, *Flight Ways: Life and Loss at the Edge of Extinction* (New York: Columbia University Press, 2014).

<sup>15</sup> Brian Charlton, email message to the author, December 24, 2017.

"University Archives," *UCLA Library*, accessed 26 April 2019, <https://www.library.ucla.edu/special-collections/university-archives>.

<sup>16</sup>David O. Renz & Associates, *The Jossey-Bass Handbook of Nonprofit Leadership and Management, Fourth ed.* (Hoboken, NJ: John Wiley & Sons, Inc., 2016).

exhibit is an ethical space. They explain how to present sources, read the audience, and increase accessibility so the real juices of the topic can flow. Another way these sources come in handy is in building the third leg of the exhibit space, the visceral, where the audience can explore the impact of the message in a safe space and feel empowered to next steps. All of these authors have experience in either public history institutions or environmental advocacy and they have important advice on how to do so professionally.

## II. Topic Defense

With the current government of the United States, there have been modifications that have significantly impacted public policy. These adjustments have rolled back expectations on vital legislation such as the *Clean Air* and *Clean Water Acts*. In the past two years, there have been five changes to the *Clean Air Act*:

...last month's proposal to declare that the 2012 regulation on mercury emissions from coal-fired power plants is not justified; a January 2018 decision to allow certain polluting facilities to be subject to less stringent pollution technology standards; a 2017 proposal to repeal pollution rules for certain heavy-duty trucks that use older engines; a May 2018 policy to consider the costs of ambient air pollution standards and various policies that the Democrats say have sidelined science in the emissions regulatory process.<sup>17</sup>

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Timothy Ambrose and Crispin Paine, *Museum Basics*, 3rd ed. (New York: Routledge, 2012, c1993).

Ross Parry ed., *Museums in a Digital Age* (New York: Routledge, 2010).

Katharine Hayhoe, "The Most Important Thing You Can Do to Fight Climate Change: Talk About It," *TED*, published November 2018, accessed 3 February 2019, [https://www.ted.com/talks/katharine\\_hayhoe\\_the\\_most\\_important\\_thing\\_you\\_can\\_do\\_to\\_fight\\_climate\\_change\\_talk\\_about\\_it?language=en](https://www.ted.com/talks/katharine_hayhoe_the_most_important_thing_you_can_do_to_fight_climate_change_talk_about_it?language=en).

<sup>17</sup> Timothy Cama, "House Dems Scrutinize Trump EPA air pollution policies," *The Hill*, 28 January 2019, accessed 30 January 2019, <https://thehill.com/policy/energy-environment/427314-house-dems-scrutinize-trump-epa-air-pollution-policies>.

Unfortunately, the *Clean Air Act* isn't alone in its stripping down. The rollbacks to the *Clean Water Act* have allowed the current administration to allow two highly toxic chemicals, Perfluorooctanoic acid and Perfluorooctanesulfonic acid, back into our drinking water.<sup>18</sup> Most Americans are entirely unaware of the history behind these two policies and the extremely deadly toxicity events which led to their creation. If they were educated on the necessity for these checks and regulations, they might be more inclined to vote to protect them. However, it is not just the visible dangers of air and water toxicity that are currently under fire.

The current President is also a strong opponent to climate change and often takes to media to denounce the history and science behind the truth with tweets such as, "In the beautiful Midwest, windchill temperatures are reaching minus 60 degrees, the coldest ever recorded. In coming days, expected to get even colder. People can't last outside even for minutes. What the hell is going on with Global Warming? Please come back fast, we need you!"<sup>19</sup> Even in countries with leaders who view climate change as reality, such as China, are desperately struggling to mitigate the effects in time to make a change.<sup>20</sup> It is a tumultuous time and the public is caught in the middle of the political firestorm. The ethical expectation of public history institutions is to provide the public with the knowledge they need in order to make informed decisions. Yet, few

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<sup>18</sup> Annie Snider, "Exclusive: Trump EPA won't limit 2 toxic chemicals in drinking water," *Politico*, written 28 January 2019, accessed 30 January 2019, <https://www.politico.com/story/2019/01/28/epa-toxic-chemicals-drinking-water-1124797>.

<sup>19</sup> Donald Trump, "In the beautiful Midwest, windchill temperatures are reaching minus 60 degrees, the coldest ever recorded. In coming days, expected to get even colder. People can't last outside even for minutes. What the hell is going on with Global Warming? Please come back fast, we need you!" *Twitter*, 28 January 2019, <https://twitter.com/realDonaldTrump/status/1090074254010404864>.

<sup>20</sup> Ben Westcott, "China's greenhouse gas emissions rising, undermining Xi's climate push," *CNN*, 30 January 2019, accessed 30 January 2019, <https://www.cnn.com/2019/01/30/asia/china-coal-emissions-climate-change-intl/index.html>.

institutions show the audacity to take it on. Thus, the topic of climate change is one of, if not the most, relevant topic facing historians today.

The conclusions of this project are not entirely different than the conclusions of other histories of climate change. There is a strong agreement among historians that climate change is real and there have been many different pollutants that have been put into the environment over time. John L. Brooke, Mike Hulme, Benjamin Lieberman, Elizabeth Gordon, and J.R. McNeill include very strong theses supporting the reality of climate change in their comprehensive works. However, the trouble is that these works cover so many events in human history that they sacrifice unpacking these moments.<sup>21</sup> On the other side of the spectrum are historical works such as those by Devra Davis and Chip Jacobs & William J. Kelly which focus so specifically on a certain topics that they neglect to fully integrate the toxicity events back into the greater narrative on climate change.<sup>22</sup> This project will combine the best of both sides and create what is referred to in the food industry as the ‘bliss point.’<sup>23</sup> The bliss point is the perfect blend of sweet and salty that leaves someone craving more of that food. With regards to this research, the bliss point will

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<sup>21</sup> Brooke, *Climate Change*.

Hulme, *Why We Disagree*.

Lieberman and Gordon, *Climate Change in Human History*.

McNeill, *Something New*.

<sup>22</sup> Davis, *When Smoke Ran*.

Jacobs & Kelly, *Smogtown*.

<sup>23</sup> Here & Now Staff, “How the Food Industry Helps Engineer Our Cravings,” *NPR*, 16 December 2015, accessed 31 January 2019, <https://www.npr.org/sections/thesalt/2015/12/16/459981099/how-the-food-industry-helps-engineer-our-cravings>.

be finding an effective balance between seeing the broader history of climate change and showing the supreme relevance of the more specific toxicity events.

The goal of informing the audience will be accomplished by beginning with a safe space that inspires a deep love of nature and creating a visceral reaction. Next it will move into the ‘visible’ by drawing upon select air and water toxicity events that led to the development of the *Clean Air* and *Clean Water Acts*. Then, it will build upon these very visible and very deadly events and enter into the ‘invisible’ narrative of greenhouse gases and climate change. By giving the audience something tangible in the beginning, like a river on fire, it makes it easier for them to transfer their understanding to something intangible, like increase levels CO<sub>2</sub> in the atmosphere since the end of WWII. In making this exhibit interactive and visceral, it will also allow the public to experience environmental history as never before by literally being immersed in it. Studies have shown a worldwide decline in reading with the boom of technology.<sup>24</sup> By relying on truncated and biased sound bites, the public is not getting access to accurate data and information. In order to meet those ethical needs for verifiable knowledge, public history institutions need to present on climate change.

The implications of this project are far-reaching. If effective, it has the potential to influence numerous political and cultural factors. First, the public may feel compelled to political action in defense of the *Clean Air* and *Clean Water Acts*. They may also have a desire to see more environmentally friendly policies at the national, state, and local level. This exhibit has the potential to influence their voting patterns for elected officials and ballot measures. Second, there

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<sup>24</sup> Caleb Crain, “Why We Don’t Read- Revisited,” *The New Yorker*, 14 June 2018, accessed 31 January 2019, <https://www.newyorker.com/culture/cultural-comment/why-we-dont-read-revisited>.

are numerous cultural shifts that may result from increased public awareness. There will be a section of the exhibit devoted to what life changes people can make right now to better the environment. Some of them will be obvious greenhouse gas reducers like carpooling, riding bikes, and walking when possible. Others will be changes to household and personal activities which make a large impact, such as bringing a reusable straw when going out or using reusable bags when shopping. By giving the audience ideas on how they can take the knowledge learned within the exhibit and apply it to their daily lives, it breaks the cycle of futility which can be created by being exposed to so much grave and bleak historical information. Instead, it leaves the audience feeling empowered to internalize the information and take action to prevent further destruction. Climate change is serious, but there is still something we can do. The purpose of the exhibit is to move the public to critically challenge the climate denying narrative and question their place within the system.

### **III. Source Analysis**

The Donora Historical Society has a Smog Museum which is tied to the events of the 1948 air toxicity event.<sup>25</sup> A copy of all their digitized materials was acquired from the museum during a previous project.<sup>26</sup> There are many images, videos, and other primary artifacts related to the events included on the USB copy. The benefit of this digital repository is that many of these artifacts are only located in Donora, PA. They have not been digitized to be released online and

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<sup>25</sup> “1948 Smog,” *Donora Historical Society*, accessed 8 February 2019, <https://www.sites.google.com/site/donorahistoricalsociety/1948-smog>.

<sup>26</sup> Brian Charlton, email message to author, 24 December 2017.



the only way to interact with these resources beyond requesting a copy is by visiting the physical location of the museum. Therefore, there are many artifacts included which have not been seen by the public. This exhibit will partner with the Donora Smog Museum in order to bring some artifacts to the National Museum of Natural History.

Bill Barrows of Cleveland State University was contacted and directed this research to specific online archives containing images of the Cuyahoga River Fires.<sup>27</sup> The images of the river's destruction are very impactful. *Contemplating Climate Change* also intends to partner with the Michael Schwartz Library at Cleveland State University to bring these primary sources to the National Museum of Natural History to be put on display. Other collaborations for the exhibit include working with Caltech and utilizing their resources on Arie Haagen-Smit.<sup>28</sup>

There are numerous digital archives supplying really profound images of source material related to the Los Angeles smog of 1943.<sup>29</sup> However, the actual images reside at various institutions across Southern California. Many images that will be included in the exhibit are presently in the University of California, Los Angeles' Library Special Collections and the

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<sup>27</sup> "Search," *The Cleveland Memory Project*, accessed 8 February 2019, <http://images.ulib.csuohio.edu/cdm/search/searchterm/cuyahoga%20river%20fires%20disasters/field/all/mode/all/conn/and/order/nosort>.

<sup>28</sup> "Arie Haagen-Smit Archive," *California Institute of Technology Archives*, accessed 7 April 2019, <http://archives-dc.library.caltech.edu/islandora/object/ct1%3A3804>.

<sup>29</sup> Kat Eschner, "This 1943 'Hellish Cloud' Was the Most Vivid Warning of LA's Smog Problems to Come Southern California—and LA in particular—continue to struggle with smog," *Smithsonian*, 26 July 2017, accessed 8 February 2019, <https://www.smithsonianmag.com/smart-news/1943-hellish-cloud-was-most-vivid-warning-las-smog-problems-come-180964119/>.

Rian Dundon, "Photos: L.A.'s mid-century smog was so bad, people thought it was a gas attack Pollution earned the city the nickname 'Smell-A'," *Timeline*, 23 May 2018, accessed 8 February 2019, <https://timeline.com/la-smog-pollution-4ca4bc0cc95d>.

Nathan Masters, "L.A.'s Smoggy Past, in Photos," *KCET*, 17 March 2011, accessed 16 March 2019, <https://www.kcet.org/shows/lost-la/las-smoggy-past-in-photos>.

University of Southern California's University Archives.<sup>30</sup> Another partnership will exist between these institutions and the NMNH in order to have their presence in the exhibit. Of equal impact for smog resources are the newspaper archives which hold articles by the Los Angeles Times.<sup>31</sup> These resources are digitized. While it is possible to get physical artifacts from the Los Angeles Times to include in the exhibit, it is more impactful to use them as a sensory tool. Thus, the audience will be able to interact with a replica of a primary source document. To see these stories in newspapers that many Americans still read today will allow them to relate to these events on a personal level because it shows that the events of the past are not so far removed from the present.

There is another set of unconventional primary source material for this project which includes environmental writings by poets, stories from activists, images by artists, and the scientific data of different laboratories. Some of these writings, such as Walt Whitman's *Leaves of Grass*, do not easily exist in their original form.<sup>32</sup> The majority of the original manuscript for *Leaves of Grass* was unintentionally burned and no real shreds of "Song of the Open Road" exist. However, this may prove beneficial because the purpose of the quotes in the exhibit space will be more for emphasis than primary source viewing. They will be hung upon plaques in various parts of the museum so the originals are unnecessary. Scientific accounts, such as Rachel

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<sup>30</sup> "Library Special Collections," *UCLA Library*, accessed 16 March 2019, <http://www.library.ucla.edu/special-collections>.

"University Archives," *USC Libraries*, accessed 16 March 2019, <https://libraries.usc.edu/locations/special-collections-department/university-archives>.

<sup>31</sup> "Smog," *Newspapers.com*, accessed 8 February 2019, [https://www.newspapers.com/search/#lnd=1&dr\\_year=1948-1948&query=Smog&t=4312&oquery=Smog+1948](https://www.newspapers.com/search/#lnd=1&dr_year=1948-1948&query=Smog&t=4312&oquery=Smog+1948).

<sup>32</sup> Ed Folsom, "WHITMAN'S MANUSCRIPT DRAFTS OF "SONG OF MYSELF" *Leaves of Grass*, 1855" *University of Iowa*, accessed 8 February 2019, <http://bailiwick.lib.uiowa.edu/whitman/index.html>.

Carson's *Silent Spring*, will also be included to bring a human face to the fight to save the environment. There are many primary sources available on this topic at the Beinecke Rare Book and Manuscript Library at Yale University.<sup>33</sup> In the case of the Keeling Curve, the data will actually be best used in its present digital format because it shows a significant trend over time when seeing how many parts per million of CO<sub>2</sub> is in the atmosphere now when compared to the air toxicity events of the 1940s.<sup>34</sup> Also, the images of animals facing the challenges of pollution and climate change will be exhibited. Some will be taken from published works, such as *Wonders: Spectacular Moments in Nature Photography*.<sup>35</sup> Others are not in an archive, but all will be requested for reproduction from the artist themselves, as outlined in Chapter Four. These unconventional primary sources will be used to evoke a visceral response from the audience experiencing the exhibit. The poetry will be heartfelt, the data impactful, and the images jaw dropping. The goal is that the audience will no longer see nature as something to be conquered. Instead they will see it as something alive, deserving of life, and worthy of saving.

Primary source material is always colored by the experiences of those writing it. The images of nature photographers, the stories of Thom Van Dooren, the arguments of Rachel Carson, and the prose of Walt Whitman are all influenced by their personal relationship with nature. They see the environment as being something valuable beyond what it can do for us and it shows in how they compose their works. Nevertheless, there is credibility to an emotional experience with nature, especially when it is accompanied by scientific facts. All of the primary

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<sup>33</sup> "Rachel Carson Papers," *Yale University Libraries*, accessed 8 February 2019, <https://beinecke.library.yale.edu/collections/highlights/rachel-carson-papers>.

<sup>34</sup> "The Keeling Curve."

<sup>35</sup> Rhonda Rubinstein ed., *Wonders: Spectacular Movements in Nature Photography* (San Francisco, CA: Chronicle Books, 2018).

sources, from Donora to nature photographs, are entrenched in the reality of the situation. They show the damage caused by unregulated systems of pollution and evoke questions of what happens if those systems continue down the same path. They have not been manipulated. Images of the smog in Los Angeles were not doctored nor were the counts of dead fish Rachel Carson recorded with the insecticide fallout. If anything, their data is so real that it strengthens the argument that climate change is real.

This primary source material differs from the theses of other histories because it is not settling for either too broad or too narrow a focus. Instead, this exhibit will have its foundations in three modes: the visible, the invisible, and the emotional. The visible realm includes the air and water toxicity events of Donora, Los Angeles, and Ohio. The invisible includes data on greenhouse gas emissions and their impact on the environment. The emotional is an appeal to what makes us human: beauty, complexity, inspiration, pain, suffering, determination, and love. Many histories have covered greenhouse gases. A few have focused on the visible events leading to the *Clean Air* and *Clean Water Acts*. However, none have done both effectively, and none have ever attempted to appeal in an artistic and expressive way. By developing a relationship with the audience and immersing them in a love of nature through moving images, heartfelt poetry, and expressive stories, it is more likely that they will be open to notoriously difficult subject matter. Katharine Hayhoe, a climate scientist, has done much research into why people are so oppositional when faced with the facts of climate change.<sup>36</sup> She found that most people believe their stance to be part of their identity and any challenge to that is a challenge to them as

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<sup>36</sup> Hayhoe, "The Most Important Thing."

an individual. This theory has also been accepted by environmental historians such as J. Donald Hughes who stated:

Many environmental historians maintain that what people think and believe exerts a motive force on how they will behave in regards to the natural world. Others point out that people are skillful at adapting their attitudes, whether enjoined by commandments or evolved by personal philosophies, to their needs and desires, and that this is as true of the environmental sphere as of any other.<sup>37</sup>

Hayhoe's research also revealed that one way to overcome this feeling is by developing a relationship with the climate change denier. In order to develop a relationship with someone, we must be willing to be fragile and make a safe space for fragility. Using art, personal stories, poetry, prose, music, and whatever other impactful visceral creativity that is available, this space can bridge that gap. It can make people feel.

#### IV. Historiography

Environmental history is a newer topic in the academic profession. It can be traced to George Perkins Marsh's 1864 work *Man and Nature: Or Physical Geography as Modified by Human Action*.<sup>38</sup> Academically, the practice was expanded by Samuel P. Hays' 1959 work *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920* and Roderick Frazier Nash's 1967 work *Wilderness and the American Mind*.<sup>39</sup> A majority of

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<sup>37</sup> J. Donald Hughes, *What is Environmental History?*, 2nd ed. (Malden, MA: Polity Press, 2016), 9.

<sup>38</sup> George Perkins Marsh, *Man and Nature: Or Physical Geography as Modified by Human Actions* (Scotts Valley, CA: CreateSpace Independent Publishing, LLC, 1864, c.2018).

<sup>39</sup> Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement 1890-1920* (Cambridge, MA: Harvard University Press, 1959, c.1969).

historical writings on the subject have only appeared at the turn of the current century. Historiographies have been done, but there is still much debate surrounding most of the subject matter of the profession. For example, there has been no consensus on the definition of ‘environmental history.’ A well-recognized definition stems from Donald Worster’s book *The Ends of the Earth: Perspectives on Modern Environmental History* which argues that environmental history is juxtaposition of, manipulation of, and interaction between humans and the environment in the past.<sup>40</sup> “Put in the vernacular then, environmental history is about the role and place of nature in human life.”<sup>41</sup> In J.R. McNeill’s historiography, he gives his own simplified definition, “...the history of the mutual relations between humankind and the rest of nature.”<sup>42</sup> While there is much debate over the semantics of these definitions and their implications, this project is more concerned with another aspect of contention: the lenses.

McNeill identifies three main focuses of environmental history. There is material environmental history which concerns itself with changes in biological and physical environments, the intellectual which focuses on human interpretations of the environment in the arts and letters, and there is the political, which centers on law and policies.<sup>43</sup> In Richard White’s historiography, there is more of a focus on the importance of two, the political and the

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Roderick Frazier Nash, *Wilderness and the American Mind*, 5<sup>th</sup> ed. (New Haven, CT: Yale University Press, 1967, c.2014).

<sup>40</sup> Donald Worster ed., *The Ends of the Earth* (New York: Cambridge University Press, 1988), 289-307.

<sup>41</sup> Worster, ed., *The Ends of the Earth*.

<sup>42</sup> J. R. McNeill, “Observations on the Nature and Culture of Environmental History,” *History and Theory* 42 (4):2003, <https://doi.org/10.1046/j.1468-2303.2003.00255.x>, 6.

<sup>43</sup> McNeill, “Observations on the Nature,” 6.

intellectual, which he believes gave rise to the study of environmental history.<sup>44</sup> While he does often speak of and to the tenets of the material lens, White does not actively assign it this nomenclature. Differing even further from this is J. Donald Hughes' historiography *What is Environmental History?* in which he identifies three broad categories of research which differ from those of McNeill and White.<sup>45</sup> Hughes maintains that environmental research is separated into the influence of environmental factors on human history, environmental changes caused by human actions and the rebound effects on the environment, and the history of human thought about the environment.<sup>46</sup> The first two would fall into McNeill's material lens while the third would fall into the intellectual. However, the rest of Hughes' book shows that he views the political lens as fitting into the material and intellectual. Regardless of the designations given to the lenses, each of these historiographies speaks to three distinct and separate areas of study.

*Contemplating Climate Change* is not going to conform to any of these triads. Instead, the purpose of the exhibit is to give the public an understanding of all three lenses at once because the true gap of environmental history is the assumption that it is either 'this lens or that one.' Instead of choosing one or the other, it should be treated as an 'and'. The environment has been a constant. It cannot be simplified to the material, the intellectual, or the political because all three inspire each other. Yet, when most historians write they do so within a specific lens, including McNeill who professes that he was most 'at home' in the material.<sup>47</sup> The audience of

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<sup>44</sup> Richard White, "American Environmental History: The Development of a New Historical Field," *Pacific Historical Review* 54, no. 3 (1985): 297-335. doi:10.2307/3639634, 298.

<sup>45</sup> Hughes, *What is Environmental History?*

<sup>46</sup> Hughes, *What is Environmental History?*, 4.

<sup>47</sup> McNeill, "Observations on the Nature," 6.

this exhibit is going to be the average person off the street; they will have a leaning one way or another with regards to climate change. Typically, they will not be accustomed to the academic lenses or concerned about intellectual debates over little-known specificities. In fact, this exhibit will not even be presented in a solely history-centric museum. This project will be displayed at the National Museum of Natural History in Washington D.C.<sup>48</sup> It is for the average person, their family, their friends, and tourists. In taking advantage of this metropolitan space, *Contemplating Climate Change* will have the breadth and wherewithal to educate the voting populous on the climate realities facing them today, where they came from, and what the major historical arguments in environmental history are.

This project calls upon many different secondary sources from environmental historians. In order to ground the exhibit in the main arguments of the topic, considerable attention will be given to some of the original works of environmental history. George Perkins Marsh, Samuel P. Hays, Roger Frazier Nash, and Donald Worster's books set the direction for academic research, development of arguments, and establishment of an environmental narrative. They will be included and cited in order to give the audience a stable and accurate background for climate change and human/environment interaction. Donald Worster's definition of environmental history will also be at the forefront of exhibit development to give perspective and inspire critical conversation among attendees.<sup>49</sup> For current evidence of climate change, information will be pulled from comprehensive climate histories from renowned researchers like J.R. McNeill, Professor of History at Georgetown University and the School of Foreign Service, who takes a

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<sup>48</sup> "Discover the Natural World," *National Museum of Natural History*, accessed 16 March 2019, <https://naturalhistory.si.edu/>.

<sup>49</sup> Worster ed., *The Ends of the Earth*, 292.



very quantifiable approach to climate change by doing his best to present the data sans interpretation in his book *Something New Under the Sun*. McNeill is so devoted to a neutral interpretation that he warns, “For those who like their issues uncomplicated and their morality simple, this will disappoint. For those who like apples and oranges reduced to dollars for convenient accounting, this will disappoint. And for those who like to be told what to think, this will particularly disappoint.”<sup>50</sup>

Another comprehensive history of climate change of note is distinguished Professor of History at Ohio State University and Director of the Center for Historical Research, John L. Brooke’s book *Climate Change and the Course of Global History: A Rough Journey*. As mentioned previously, he not only deliberately builds an effective narrative of Schumpeterian growth, but Brooke also asserts two claims upon this growth that are unique to the history of climate change. First, he argues that mass agriculture during the 1700s and the 1800s primed the world for an increase in greenhouse gases because of the increased methane from the paddy fields in Asia and the increased CO<sub>2</sub> from deforestation in the United States which was used to make room for industrial and farming land.<sup>51</sup> Second, Brooke argues that the lack of concern for global warming actually came as a result of a stabilization of global temperatures between 1945 and the 1970s.<sup>52</sup> He writes that the increased temperatures were masked in the Northern Hemisphere due to an increase of sulfate aerosols in the atmosphere which acted as a solar reflectant and led to a cooling in the north that was entirely absent in the tropics during this time.

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<sup>50</sup> McNeill, *Something New*, XXVI.

<sup>51</sup> McNeill, *Something New*, 467-550.

<sup>52</sup> McNeill, *Something New*, 467-550, 551.

Thus, people in the Northern Hemisphere are less apt to recognize how long global warming has been going on.

Accompanying these broad histories will be resources about specific air and water toxicity events which will include, but are not limited to Chip Jacobs & William J. Kelly's *Smogtown: The Lung-Burning History of Pollution in Los Angeles* and Devra Lee Davis' *When Smoke Ran like Water: Tales of Environmental Deception and the Battle against Pollution*. Chip Jacobs is an award winning journalist in Los Angeles who has written for almost everyone local, from the *Los Angeles Times* to the *Daily News of Los Angeles*.<sup>53</sup> William J. Kelly is also a journalist, but Kelly also served as chief spokesperson for more than thirteen years for the South Coast Air Quality Management District, which is the smog control agency for greater Los Angeles.<sup>54</sup> Unlike a conventional historical record, Jacobs and Kelly wanted *Smogtown* to have a periodical-esque feel. Hence, the story of the beginnings of smog in Los Angeles and the realization that CO<sub>2</sub> was a great factor in the equation plays off as an extremely well-informed serial in a newspaper. It is swift and exciting, which stands as inspiration on how to appeal to the audience. Reading *Smogtown* barely feels like reading at all because Jacobs and Kelly make the times jump off the page as though you were living them. Utilizing quotes and a similar energetic writing style for artifact labels may get the audience further enthralled with the subject so it feels as though they are also living the experience.

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<sup>53</sup> "Reporting Highlights," *Chip Jacobs*, accessed 26 January 2019, <http://chipjacobs.com/about/02-reporting-accomplishments/>.

<sup>54</sup> Jacobs & Kelly, *Smogtown*, dust cover.

*Smogtown* also colorfully introduces on of the key players in the discovery of carbon emissions from vehicles: Arie Haagen-Smit.<sup>55</sup> In the six years following an air toxicity event, no American scientist was able to identify what made up the terrifying smog. In only few months of part-time work, Haagen-Smit was able to accurately deduce that Los Angeles' smog was directly caused by the population and automobile boom in the City of Angels. Haagen-Smit also performed experiments where he made a greenhouse chamber and filled it with smog. Visitors could then go inside and view how the toxic air was killing all the plant life inside.<sup>56</sup> This development is critical to so many other models and ideas that have taken flight in environmentalism. For one, Haagen-Smit's findings directly correlate with the increase in CO<sub>2</sub> emissions found in the Keeling Curve.<sup>57</sup> Furthermore, this increase also explains the change in climate caused by the increased presence of greenhouse gases in the atmosphere. Therefore, this book is vital to the understanding of all climate change data and would give essential pieces to the audience in order to enhance understanding. Additionally, this book is helpful because it includes many primary source materials which would be great additions to the exhibit. In particular, there is an image of a 'smog suit' which looks akin to a hazmat suit which was used to protect citizens from the eye-watering and lung-burning pains of breathing the Los Angeles air.<sup>58</sup>

Devra Davis is a leading researcher on environmental causes of breast cancer and chronic disease.<sup>59</sup> She was also raised in Donora, PA. This direct link to an air toxicity event gave her a

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<sup>55</sup> Jacobs & Kelly, *Smogtown*, 71-74.

<sup>56</sup> Jacobs & Kelly, *Smogtown*, 71-74, 76.

<sup>57</sup> "The Keeling Curve."

<sup>58</sup> Jacobs & Kelly, *Smogtown*, 100.

<sup>59</sup> Davis, *When Smoke Ran*, back cover.

very unique perspective on writing about pollution. In *When Smoke Ran Like Water* Davis is arguing that in her long search for patterns between disease and causes, there is a significant tie in the shape of pollution.<sup>60</sup> Davis did essential research into the Donora Smog of 1948 and organized the primary sources into a cohesive retelling of the event and its fallout. She also provides a good smattering of primary source material on the Los Angeles smog events. Davis also generates a large amount of statistics and data to accompany each event which leads to even more primary and secondary resources which would benefit the development of the exhibit. Due to her medical expertise, Devra Davis also produced an exhaustive list of medical findings. These are significant because most histories of climate change and pollution do not delve as deeply into physical ramifications such as cancer rates, reproductive damage, and lung issues.

Up to this point, there have been many resources showing the immediate ramifications of toxicity events. Utilizing Davis' skills in the medical field will demonstrate to the viewer that there are long-term consequences which also need to be recognized. These findings may also stand as a foundation for developing a relationship and level of trust with the audience because, as cancer and other disease rates continue to go up, the likelihood of a member of the audience knowing someone suffering from one of the conditions mentioned also increases.<sup>61</sup> Visitors will relate to the topic at hand more because it could help them understand what a loved one or they, themselves, are going through. It will also spur in them a desire to prevent more people from developing or contracting an illness.

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<sup>60</sup> Davis, *When Smoke Ran*, xiii.

<sup>61</sup> "Cancer Statistics," *National Cancer Institute*, accessed 22 January 2019, <https://www.cancer.gov/about-cancer/understanding/statistics>.

## **V. Methodology**

The greatest gap facing the secondary literature is their reliance upon either too broad of a perspective or too narrow a focus. The beauty of a physical exhibit is that it can meld the two together in order to form something meaningful for the public. The presentation of materials and academic concepts will be done in a dynamic and interactive way. Exhibits are all about separating broad ideas into digestible chunks which neither overwhelm nor alienate. Each section of the exhibit will be created in such a way that the subject matter feels familiar to the audience, reminding them of things they have read in the news or heard in conversation, yet there will be additional depth given in the form of labels accompanying the larger primary sources. The labels will challenge the audience to broaden their understanding of the environment while instructing the audience in the actual facts of the events. It will be formatted as follows:

## Chapter 2: Completed Project

### Section I: About the Exhibit

This will be a special exhibit created for the Smithsonian National Museum of Natural History in Washington, D.C. It will be a physical exhibit located on the second floor of the building for two years. There will also be a digital edition of the exhibit space uploaded to the virtual tour offered on the NMNH website. The physical exhibit will ask the audience to take pictures so they can access some of the online resources after they leave. This project centers on dynamically developing the following thesis: through exploring historical air and water toxicity events combined with evidence on the invisible toxicity of greenhouse gas emissions, the public will conclude that climate change is real. The exhibit will be separated into four distinct spaces: The Visceral, The Visible, The Invisible, and The Choices.

### Section II: The Visceral

The entrance of the special exhibit space at the NMNH features one straight wall and another wall that begins straight and branches out diagonally on the right side. The straight portion of the right wall shall serve as the introduction for the exhibit. It will feature a large sign stating “Contemplating the Climate”. Below it will be an excerpt from the poem, “Song of the Open Road,” by Walt Whitman which reads as follows:

Allons! whoever you are come travel with me!  
Traveling with me you find what never tires.

The earth never tires,  
The earth is rude, silent, incomprehensible at first, Nature is rude and incomprehensible at first,  
Be not discouraged, keep on, there are divine things well envelop’d,  
I swear to you there are divine things more beautiful than words can tell.<sup>1</sup>

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<sup>1</sup> Walt Whitman, “Song of the Open Road,” *Leaves of Grass: The Original 1855 Edition* (American Renaissance Books, 2009), Kindle.

There shall be a bench for sitting beside the entrance on the same wall as the opening from the second floor upper balcony/rotunda area.

As the diagonal wall branches out, the audience will pass over a hanging sign reading “The Visceral.” The exhibit will then open in a room that is separated into three sections by a wall in the shape of a T. The first section, along the top of the T will have a large square box on the floor. Inside this box will be textured artificial grass that has been recycled. The walls of this room will be yellow and there will be a large scene on the front wall of the T showing a beautiful serene day. This space will also have large boxes filled with amber waves of grain which will be touchable by visitors. Through a small aromatherapy device, subtle smells of freshly cut grass will emanate and fill the space. There will also be a tire swing hanging from one of the two trees found in the second space and the poem, “Arbor Vitae” by Siegfried Sassoon located on the wall under the trees.

For grace in me divined  
This metaphor I find:  
A tree.  
How can that be?

This tree all winter through  
Found no green work to do-  
No life  
Therein ran rife.

But with the awoken year  
What surge of sap is here-  
What flood  
In branch and bud.

So grace in me can hide-  
Be darkened and denied-  
Then once again

---

Vesture my every vein.<sup>2</sup>

Going right from the grass room will be the tree climb room which features a large fake tree made of recycled and reclaimed natural materials. This tree will have fake leaves on it from recycled plastic bottles and other materials made by artists specializing in recycled art. The museum already employs a very nice ocean scene that has been created with recycled materials, as seen in Figure 6, and would use this same method on all art installations throughout the exhibit. One of the tree's limbs will extend into the grass room, but the majority of the tree will be placed inside of this space where it will be climbable. The floor will be cushioned and have a layer of recycled Astroturf on it to support those who go into the tree. There will also be a fake river that flows visible beneath where people are walking at the very base of the tree. The tree itself will be easy to climb with faux steps added into it and a very wide, yet low space for the audience to stand in. It will also have a ramp so that it is wheelchair accessible. On the wall which includes the ramps and stairs shall be the poem, "The Negro Speaks of Rivers," by Langston Hughes.

I've known rivers:  
I've known rivers ancient as the world and older than the  
flow of human blood in human veins.

My soul has grown deep like the rivers.

I bathed in the Euphrates when dawns were young.  
I built my hut near the Congo and it lulled me to sleep.  
I looked upon the Nile and raised the pyramids above it.  
I heard the singing of the Mississippi when Abe Lincoln  
went down to New Orleans, and I've seen its muddy  
bosom turn all golden in the sunset.

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<sup>2</sup> Siegfried Sassoon, "Arbor Vitae," *The Path to Peace* (Yorkshire, UK: Stanbrook Abbey Press, 1960).



I've known rivers:  
Ancient, dusky rivers.

My soul has grown deep like the rivers.<sup>3</sup>

The space will utilize optical illusions in order to seem like the tree is taller than it is and that visitors are much higher than they actually are. It will also use these same illusory methods to conceal the stairs and ramp. It will be a good point for people to get pictures for their social media accounts. This room will have the aromas of the grass room with the addition of strong, yet peaceful tree smells.

In the third room of the T, moving left from the grass room, will be a faux beach. It will have false tide pools that visitors can put their hands in and feel the different creatures inside. These touchable creatures will not be alive. They will also be made with recycled trash and other reclaimed objects. There will also be a tube inside this space which has 'jellyfish' made of plastic bags that move around the space by audience interaction of flipping the tube upon a wall that is painted to look like the beach with large and beautiful ocean waves. Mirroring the giant tube on the second wall shall be the poem, "By the Sea," by Emily Dickinson.

I started early, took my dog  
And visited the sea  
The mermaids in the basement  
Came out to look at me

And frigates in the upper floor  
Extended hempen hands  
Presuming me to be a mouse  
Aground, upon the sands

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<sup>3</sup> Langston Hughes, "The Negro Speaks of Rivers," *Poets.org*, accessed 14 April 2019, <https://www.poets.org/poetsorg/poem/negro-speaks-rivers>.

But no man moved me till the tide  
 Went past my simple shoe  
 And past my apron and my belt  
 And past my bodice too

And made as he would eat me up  
 As wholly as a dew  
 Upon a dandelion's sleeve  
 And then I started too

And he — he followed close behind  
 I felt his silver heel  
 Upon my ankle, — then my shoes  
 Would overflow with pearl

Until we met the solid town  
 No man he seemed to know  
 And bowing with a mighty look  
 At me, the sea withdrew<sup>4</sup>

The room will have aromatherapy in the form of very gentle and light sea salt and ocean water.

There will also be the sound of waves quietly playing. At the very edge of this space will be the second tree. This additional tree will ensure that the entire T space is covered with a canopy through which a bright blue sky will be somewhat visible. The first tree in the river room and this tree shall be connected over the T with a walking bridge. This bridge will allow visitors to be up inside the canopy where other recycled creatures reside that they can spot and appreciate what they call home. This side will have an exit of only stairs. Visitors in wheelchairs and additional needs will have additional room in this tree to turn around and return to the ramp on the other side.

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<sup>4</sup> Emily Dickinson, "By the Sea," *Poetry Foundation*, accessed 14 April 2019, <https://www.poetryfoundation.org/poems/50976/i-started-early-took-my-dog-656>.

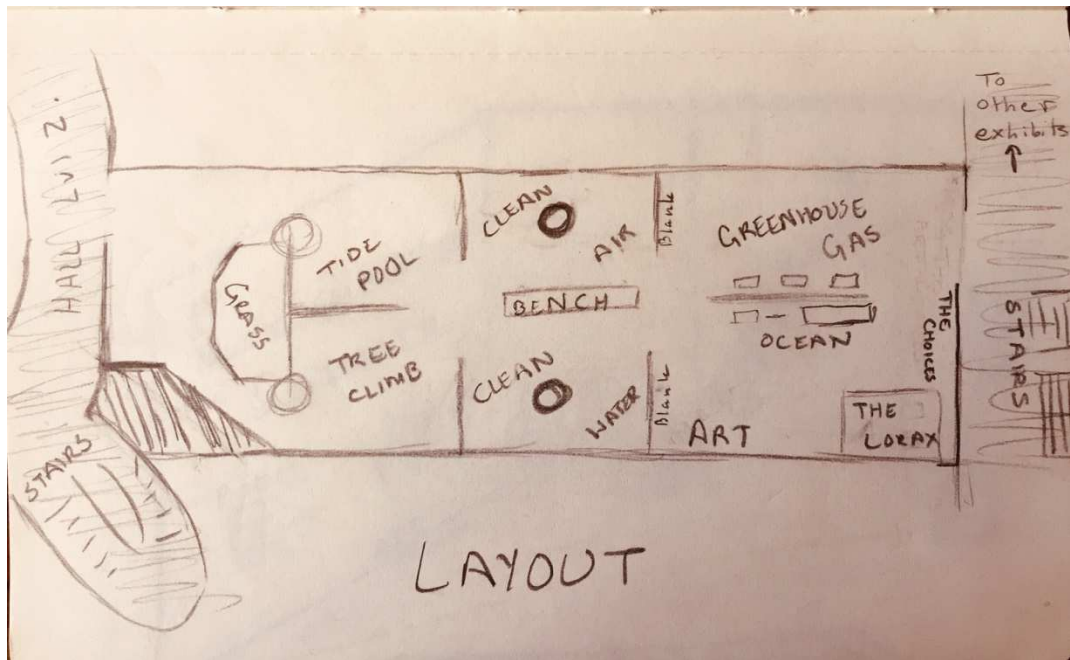
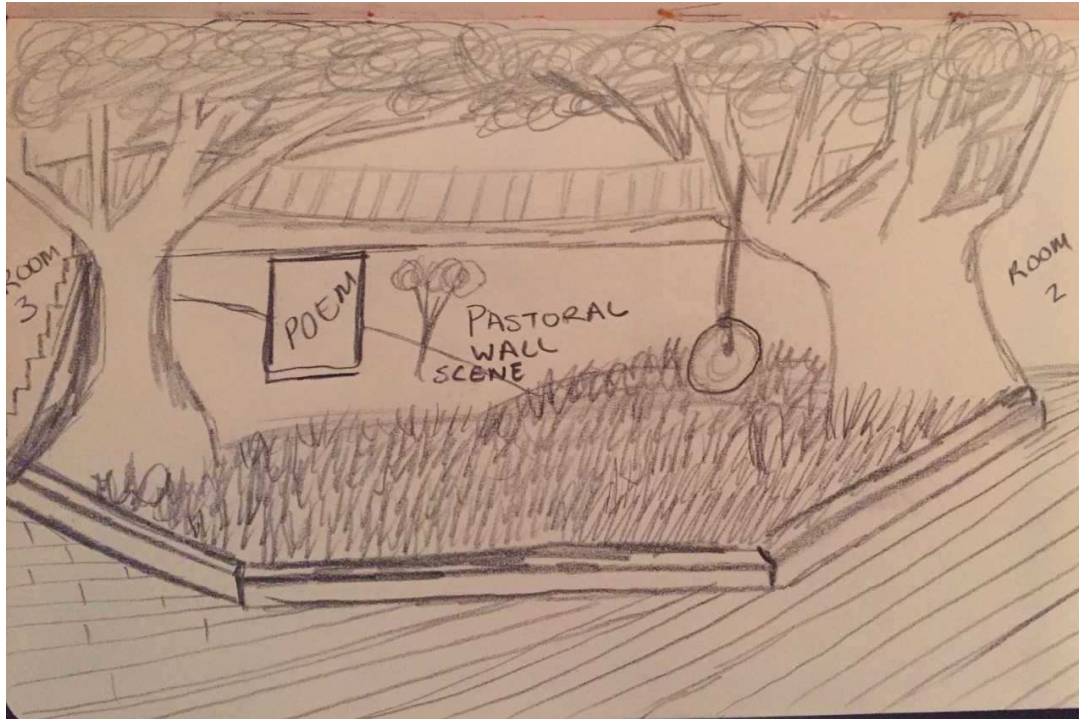


Figure 1: Exhibit Layout



Figure 2: Exhibit Entrance



**Figure 3: Grass Room**



**Figure 4: Tree Climb Room**





**Figure 5: Tide Pool Room**



**Figure 6: Recycled Art Installation in NMNH Ocean Hall<sup>5</sup>**

<sup>5</sup> Smithsonian: National Museum of Natural History, taken 24 March 2019.

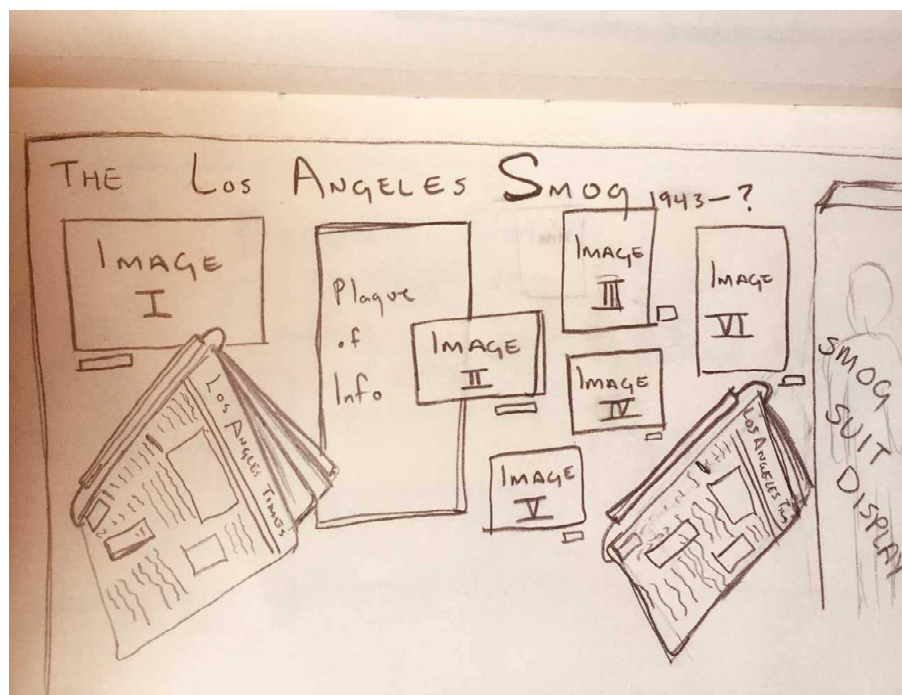
## **Section II: The Visible**

The next room the audience ventures into beyond the T will be portioned off so there is only a small entrance visible. Once into the space, there will be a long cushioned bench separating one side from the other in the middle. Hanging above this space will be another large sign stating “The Visible.” To the left will be the air toxicity events of Donora and Los Angeles. To the right will be the water toxicity events of the Cuyahoga River Fire and the DDT pollution from Rachel Carson’s book *Silent Spring*. On the dividing wall will be information about the *Clean Air* and *Clean Water Acts*.

### **Subsection I: Air Toxicity and Los Angeles**

The air toxicity events section of the space will be separated into three pieces. First, there will be the Los Angeles Smog of 1943. This section will have images of the gravity of the smog as well as images of subsequent smog events. It will also feature two tactile newspaper facsimiles made of various articles related to the Los Angeles Smog events which will be attached to the wall. Each copy will be the same to offer two access points. The public will be able to hold onto these newspapers, flip through them, and read historic articles about the event. In the corner, the audience will be able to view a replica smog suit people used to comment on the polluted air. There will also be a plaque explaining the events, why they were so dangerous. The plaque shall read:

It was 26 July 1943, deep in the throes of World War II, when Los Angeles was suddenly shrouded in a dense and eye-watering cloud. The air smelled like bleach and stung on skin. Residents panicked, thinking they were being chemically attacked by the Japanese. The day after, an investigation by city officials found the cause of LA’s first smog to be the result of pollution from Southern California Gas Company’s Aliso Street Plant. Los Angeles used to pride itself on the purity of its air, but this event was only the beginning. As time went on, more and more air toxicity events would occur. A year later, residents had acclimated to the dangers smog and would remain indoors on hazy brown days. Pollution became a staple of the Los Angeles lifestyle, one they were constantly trying to remove.



**Figure 7: The Los Angeles Smog Wall**



**Figure 8: Image I**

Los Angeles Civic Center is almost impossible to see on Jan. 5, 1948.  
*Los Angeles Times Photographic Archive/UCLA Library*<sup>6</sup>

<sup>6</sup> "University Archives," *UCLA Library*, accessed 26 April 2019, <https://www.library.ucla.edu/special-collections/university-archives>.



**Figure 9: Image II**

‘Smog’ masks are donned by members of the Highland Park Optimist Club in 1954. Perhaps they were optimistic the masks would work.

*L.A. Daily News/Los Angeles Times Photographic Archive/UCLA Library*<sup>7</sup>



**Figure 10: Image III**

To protect themselves from the 1958 pollution, pedestrians on Broadway dab their eyes and wear gas masks.

*Herald-Examiner Collection/Los Angeles Public Library*<sup>8</sup>

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<sup>7</sup> “University Archives,” *UCLA Library*, accessed 26 April 2019, <https://www.library.ucla.edu/special-collections/university-archives>.





**Figure 11: Image IV**

The president of Stamp Out Smog, Afton Slade, displays a birthday cake memorializing 21 years of smog at a news conference at the Ambassador Hotel in 1964.

*UCLA Archives*<sup>9</sup>



**Figure 12: Image V**

The smoggy skyline of downtown Los Angeles, showing the United States Courthouse (left), City Hall (middle), and Hall of Justice (right) as seen in 1956.

*Getty*<sup>10</sup>

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<sup>8</sup> “Collections & Resources,” *Los Angeles Public Library*, accessed 26 April 2019, <https://www.lapl.org/collections-resources>.

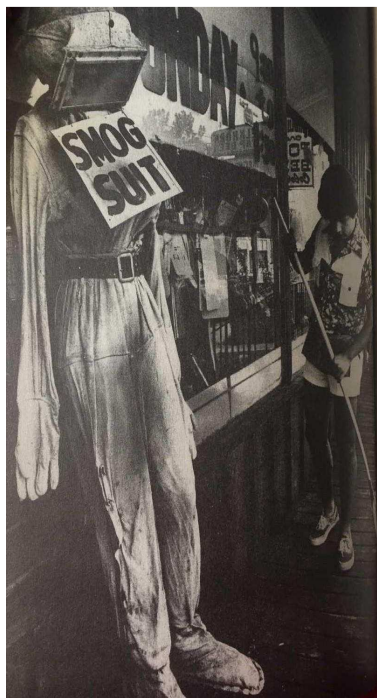
<sup>9</sup> “University Archives,” *UCLA Library*, accessed 26 April 2019, <https://www.library.ucla.edu/special-collections/university-archives>.



**Figure 13: Image VI**

Though humorous, this 'pure' air would prove a strong relief to the eye-watering reality of the smoggy skies.

Getty<sup>11</sup>



**Figure 14: Smog Suit Replica Display**

A replica of the smog suits that people satirically advertised in places such as Los Angeles.

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<sup>10</sup> Rian Dundon, "Photos: L.A.'s mid-century smog was so bad, people thought it was a gas attack Pollution earned the city the nickname 'Smell-A'," *Timeline*, 23 May 2018, accessed 26 April 2019, <https://timeline.com/la-smog-pollution-4ca4bc0cc95d>.

<sup>11</sup> Rian Dundon, "Photos: L.A.'s mid-century smog was so bad, people thought it was a gas attack Pollution earned the city the nickname 'Smell-A'," *Timeline*, 23 May 2018, accessed 26 April 2019, <https://timeline.com/la-smog-pollution-4ca4bc0cc95d>.





**Figure 16:** This article will be included as a flippable paper in the Los Angeles Smog portion of the exhibit and will not include a label.<sup>13</sup>

<sup>13</sup> "Storm Over Fumes Grows (Continued from First Page)," *Los Angeles Times*, 6 October 1943, accessed 28 March 2019, <https://www.newspapers.com/image/380793248/?terms=los%2Bangeles%2Bsmoke#>.



## LETTERS FROM READERS

## Posing the Smog Problems

This paper is devoted today to a discussion of the Los Angeles smog problem in connection with the editorial by Prof. Raymond E. Tucker. The smog, smoke, and fumes expert, who will make an exhaustive survey of the metropolitan area, Prof. Tucker, head of the mechanical engineering department of Washington University and former Smog Commission of St. Louis, will conduct his study at the request of The Times, which is helping him here at its own expense on a public service. The expressions on this page come from some of the best informed officials in Southern California.

**BY L. A. BEUTCH, Director, Office of Air Pollution Control, Los Angeles County**  
The personnel of the county Office of Air Pollution Control welcomes Prof. Raymond E. Tucker to Los Angeles with the spirit of the fellow engineer and scientist. We are happy that The Times has brought an outstanding authority on smog and combustion engineering to Southern California. In his latter capacity, Prof. Tucker will unquestionably prove of tremendous value to our community by helping to coordinate the various attacks now being made upon the smog. No civic problem. His report will undoubtedly shed out any waste or duplicated efforts now being made and point the most direct road which will lead to the successful elimination of the smog. Prof. Tucker's firm, which has played a major role in the development of weather conditions favor accumulation of substances foreign to a pure atmosphere.

In studying the general situation, the first question that probably will present itself will be "How does the nature and extent of atmospheric pollution in metropolitan Los Angeles compare with that encountered in other manufacturing areas?"

Smoke produced by heating and power plants has been the Los Angeles smog. It is worthy to air pollution authorities in industries and nature industries in industries. Analysis of the local problem indicates that metropolitan Los Angeles is the cleanest large manufacturing district in the United States as far as smoke, grime and carbon resulting from incomplete combustion in heating and power plants are concerned. Whether there are made of strained acids suspended in the atmosphere, of dust settling out of the atmosphere or by a byproduct observation, investigations are forced to the inevitable conclusion that the Los Angeles air pollution problem differs markedly from that encountered in manufacturing areas.

With less smoke discharged into the atmosphere by heating and power plants, the Los Angeles problem is different from that met in other industrial areas.

First, and what this office considers to be No. 1 problem, are the stages of smog that literally drive our citizens to tears. To the best of our knowledge, no other large community in the world has

## Difficulties of the District Attorney

**BY WILLIAM E. RIMMON, District Attorney of Los Angeles County**  
The District Attorney's office, as has been demonstrated in the past, is keenly interested in leading its assistance toward the solution of the smog and fumes problem in Los Angeles County.

I intend, as District Attorney, to continue and augment this program. Inasmuch as this law enforcement office can contribute to a betterment of the situation, it will do so.

One comprehensive case covering a number of alleged offenses in county territory or in incorporated areas within the county now is pending and will be carried through the courts with vigorous prosecution unless the conditions which caused the complaints are corrected. We have ample authority under the State anti-smoke laws to carry on the necessary prosecutions. We also are fortified with the decision of Superior Court Judge Vickers that the State as represented by this office can proceed against manufacturing concerns despite the jurisdictional involvement in Section 721A of the State Code regarding smog.

And this brings up a point to which the State Legislature should give its attention next month. Section 721A should be amended to exempt public utilities from being from these smog restrictions so that nuisance cases of this nature may be decided on the same basis as any other nuisance, without the defendant resorting to legal maneuvering on this one point.

This office, it will be recalled, sought to have this amendment put through at the 1945 session of the Legislature. It passed

## Actions of the Health Committee

**BY L. E. TIMBERLAKE, Chairman, Public Health and Welfare Committee, Los Angeles City Council**  
During my chairmanship of the Public Health and Welfare Committee, this committee has had numerous conferences in an endeavor to reduce the smog situation in the city.

This committee sponsored a smoke ordinance and the creation of an air pollution control bureau under the jurisdiction of the Board of Health Commissioners, and recommended that the City Attorney collaborate with the County Council in order that an overall county smoke control ordinance be adopted, and that the State Legislature be requested to pass enabling legislation to give the county necessary powers to obtain strict compliance, which are at the present time lacking.

Although the director of the Bureau of Air Pollution Control has reported cooperation from industry as a whole, one of the main contributions to smog conditions in the city has yet to be controlled. I refer to the burning of tires, tires, trash, etc., in private incinerators. The only solution to this problem, not only from the standpoint of eliminating smog, but also to clean up the city on a permanent basis, is that a city-wide collection of combustible rubbish be inaugurated. This

Los Angeles Times  
MONDAY MORNING, DECEMBER 9, 1946

## Block That Kick!



## County Is 'Ready, Willing and Able'

**BY RAYMOND V. DABNEY, Chairman, Los Angeles County Board of Supervisors**  
Los Angeles County is ready, willing and able to proceed with the solution of the smog situation, which has become a nuisance and menace upon our civic life. We will see that I have said the word "willing." We are like the proverbial man who has the mathematical problem—he knows the problem and can look in the back of the book to see the answer.

What lies in between? Many hours of burling the smog situation might not be spent here we solve the problem. There are many contributing factors. Burning of rubbish at dumps and in at least a half-million back yards daily, railroad locomotives, gasoline-powered equipment, industry, and a few other lesser causes become the factors involved in this effort to eliminate a beautiful, desert Southern California. As we are a county government, when laws are enacted, we are authorized to take certain rights they previously enjoyed. In this case, all contributors will either voluntarily cooperate or we will have to force the practice of dumping dirty wastes and gases into a God-given clean atmosphere.

Then there is a monetary outlay. The Board of Supervisors submitted a bond issue to the people last August. Among the propositions was one of \$500,000 to be used for the construction of modern, adequate incinerators. Because of a provision in our laws requiring a two-thirds vote of the people, it was defeated. Undoubtedly, the County Board of Supervisors is now working on this problem. Do not give up. There is a way out. On behalf of the Board of Supervisors and employees of Los Angeles County I tell you you may rest assured that we will continue, yes, renew and increase our effort toward this end.

## 'When These Things Are Done—'

**BY HARRY E. KUNKEL, Director, Bureau of Air Pollution Control, City of Los Angeles**  
The term "smog" as applied to eastern smog is a misnomer. It is a misnomer because it does not adequately describe the Los Angeles air pollution problem.

The public could endure man-made haze that blocks out beautiful mountain scenery and reduces general visibility but citizens rightly demand relief from irritating "gas attacks." These attacks of irritants become serious enough to cause newspaper publicity and official investigations to begin early in 1940.

Industry and railroads have received their share of the blame. Through their control, industry located within the city of Los Angeles has shown it can operate without creating a nuisance. In many cases cost of equipment for control has been high and over \$100,000 for the Diesel truck industry is making real progress in attaining practical emission reduction. Railroads are rapidly changing from steam to diesel.

We have repeatedly requested a scientific study by some competent, impartial individual or organization, and as we want to know if the smog and particularly the irritants are produced by some distant industry or whether they are generated by automotive power, rubbish fires and other sources in or close to the metropolitan area where the effects are felt. We'd like to be able to say "when these things are done again we will build these incinerators on a time out of general tax money of necessity."

Thanks to The Times for its willingness to attack fearfully this problem. Do not give up. There is a way out. On behalf of the Board of Supervisors and employees of Los Angeles County I tell you you may rest assured that we will continue, yes, renew and increase our effort toward this end.



## OPINIONS OF THE PEOPLE

## The Legal Right to Clear the Air

**Deputy County Counsel Representing County Council Harold W. Kneass**  
The staff of the County Office of Air Pollution Control consists entirely of engineers, chemists and other experts who are able to give an offender qualified technical advice. In many cases they can point out how he can save money by eliminating the smoke or fumes nuisance.

A county ordinance is effective only in the unincorporated areas of the county. The county has no power to make an ordinance, such as the air pollution control ordinance, effective within the limits of incorporated cities. That the cooperation of cities is absolutely necessary.

Several of the industrial and semi-industrial cities of the county have so far failed to adopt the uniform ordinance for fear that it might in some way prejudice the existing industries in industrial areas. To all of the cities in the county pass such an ordinance it will be impossible to control the air pollution and smog problem to the entire county without state legislation.

The proposed legislation is still in the formative stage but the following suggestions have been made Section 721A of the Code of Civil Procedure, prohibiting the existing industries in industrial areas, should be amended to exempt such public utility from the law of air pollution control. The Health and Safety Code should be amended to make air pollution control part of the duties of the health officer, so that the administrative measures of that office can be used to combat smog.

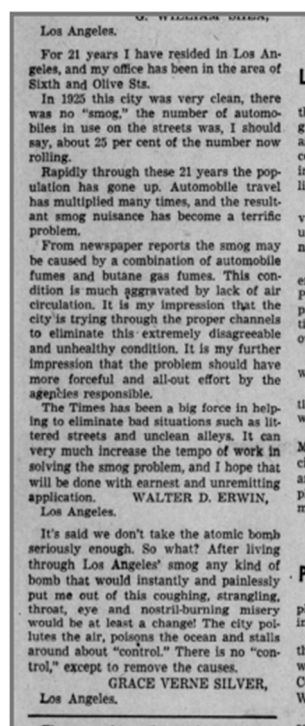
In the present county ordinance could extend the use of the Rimpelmann chart to all cities. The creation of a county-wide air pollution control district would, without setting up any new machinery or involving any additional governmental expense, give the Board of Supervisors the power to make simple, scientific regulations and uniform enforcement of these regulations throughout the county, that is, within the incorporated areas as well as in the unincorporated areas. At the same time it would avoid the necessity of extending municipal control to the rural portions of California.

The County Council's office hopes that every city in the county that has not already done so will pass the uniform air pollution control ordinance and contract for enforcement at county expense. Changes in state law are desirable, especially if any cities fail to cooperate.

The Supreme Court of the United States, in *Don Minton, et al. v. City of Los Angeles*, 326 U.S. 498, 40 S.Ct. 1031, 80 L.Ed. 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 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**Figure 18:** This article will be included as a flippable paper in the Los Angeles Smog portion of the exhibit and will not include a label.<sup>15</sup>



**Figure 19:** This article will be included as a flippable paper in the Los Angeles Smog portion of the exhibit and will not include a label.<sup>16</sup>

<sup>15</sup> "Los Angeles' Smog Drifts Over Valley, Auto Club Survey Shows," *San Bernardino County Sun*, 7 December 1946, <https://www.newspapers.com/image/49466209/?terms=los%2Bangeles%2Bsmog#>.

## **Subsection II: Air Toxicity and the Donora Smog of 1948**

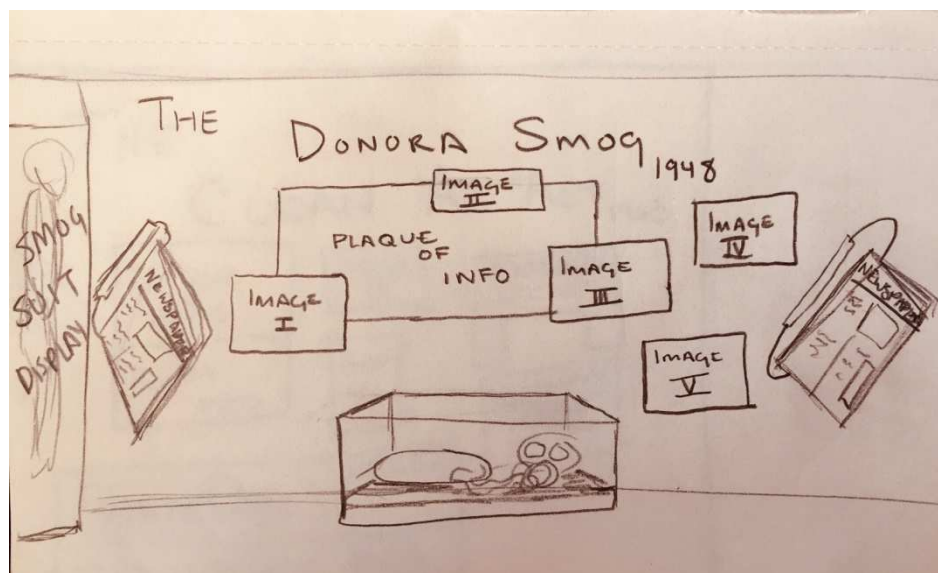
The second portion of this space will be devoted to the Donora Smog event of 1948. It will also feature images, two tactile newspapers, and a plaque explaining the event. However, this section will also be related to the model which stands in the middle of the space. This model will be a miniature of the town of Donora, PA. In order to show what a weather inversion is like, this piece will have a domed cover and will, on a timer, fill up with smog so that the audience can understand how intense the immersion was. After about a minute of filling up, the smog will be vacuumed out of the dome by an apparatus built under the table whereupon it shall begin the process again after about a two minute wait. As many of the pieces as possible within the model will be made from repurposed or recycled materials. This piece shall also be accompanied by a label explaining what the weather inversion was and why it was so deadly. Near the floor, there will be a gas mask with an attached oxygen tank on loan from the Donora Smog Museum. The plaque for this section shall read:

On 27 October 1948, the small town of Donora, Pennsylvania was subject to a weather inversion which trapped all air within a dome over the city for multiple days. During this event, the zinc and steel plants continue to run, polluting the air and filling the city with deadly hydrogen fluoride and sulfur dioxide emissions. The smog ended four days later on the 31th, but the damage was already done. Twenty people died as a result of the noxious fumes and another 6,000 became seriously ill. For a town of only 14,000, the danger was significant enough to garner national attention and a call for change. The 1948 Donora smog is still considered one of the worst pollution disasters in the history of the nation.

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<sup>16</sup> Grace Verne Silver, "Letter to the editor," *Los Angeles Times*, 23 September 1946, accessed 28 March 2019, <https://www.newspapers.com/image/380747096/?terms=los%2Bangeles%2Bsmog#>.





**Figure 20: The Donora Smog Room**



**Figure 21: Image I**

This is the thickness of the smog that flooded the city of Donora during the air toxicity event.  
 Getty<sup>17</sup>

<sup>17</sup> "Smog in Donora" *Donora Smog Museum* (photograph, Donora, PA).





**Figure 22: Image II**

A nurse is administering oxygen to a person suffering during the Donora Smog episode as others discuss.

*Getty*<sup>18</sup>



**Figure 23: Image III**

In the background of this image is Donora Zinc Works, the industrial company that caused the air toxicity event when the weather inversion trapped the smoke and pollution visible in this picture.

*Donora Smog Museum*<sup>19</sup>

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<sup>18</sup> Lorraine Boissoneault, "The Deadly Donora Smog of 1948 Spurred Environmental Protection—But Have We Forgotten the Lesson?" *Smithsonian*, 26 October 2018, accessed 24 April 2019, <https://www.smithsonianmag.com/history/deadly-donora-smog-1948-spurred-environmental-protection-have-we-forgotten-lesson-180970533/>.



**Figure 24: Image IV**

Image of Donora Street where the smog encompassed the streets from October 27 and October 31. The inversion dome finally broke when it rained and allowed the pollution to release.

Getty<sup>20</sup>



**Figure 25: Image V**

These patients in Donora, PA were placed into oxygen-tented beds during the smog event and were still recovering on 3 November 1948 when this image was taken.

Corbis-Bettmann<sup>21</sup>

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<sup>19</sup> “Donora Zinc Works,” *Donora Smog Museum* (photograph, Donora, PA).

<sup>20</sup> Lorraine Boissoneault, “The Deadly Donora Smog of 1948 Spurred Environmental Protection—But Have We Forgotten the Lesson?” *Smithsonian*, 26 October 2018, accessed 24 April 2019, <https://www.smithsonianmag.com/history/deadly-donora-smog-1948-spurred-environmental-protection-have-we-forgotten-lesson-180970533/>.

<sup>21</sup> “Patients In Oxygen-Tented Beds, Donora, Pennsylvania, November 3, 1948.” *Explore PA History*, accessed 23 April 2019, <http://explorepahistory.com/displayimage.php?imgId=1-2-1516>.



**Figure 26: Donora Smog Dome**

The weather inversion created a dome over the city preventing airflow in and out. Just as a balloon traps helium, this dome trapped all the pollutants. With no space to dissipate, the air became more and more noxious by the second.



**Figure 27: Gas Mask and Tank**

*Donora Smog Museum*<sup>22</sup>

<sup>22</sup> "Gas mask and Tank," *Donora Smog Museum* (artifact, Donora, PA).



# The Pittsburgh Press

WEATHER—Cloudy, with occasional rain.  
VOLUME 65, No. 131 TWO SECTIONS—32 PAGES PITTSBURGH, PA., MONDAY, NOVEMBER 1, 1948  
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PRICE FIVE CENTS

## DONORA SMOG DEATHS PROBED

### 3 Dig Way Out of Western Pen

#### Convicts Work Months To Excavate Tunnel 35 Feet to Freedom

Three burly convicts tunneled their way out of Western Penitentiary, Woods Run, and escaped early today. All long-term convicts, they made the break some time between 6:30 and 7:30 a. m.

They crawled through a 35-foot tunnel from the boiler house, under a prison driveway, up to Monaghan St., a dirt road.

Officials said it must have taken them several months to carve the escape route.

They were identified as:

Andrew Lee White, 27, of 704 Copeland St., sentenced to 15-30 years for burglary, robbery, assault and battery.

Charles R. Brown, 34, of 1001 1/2 St., sentenced to 10-20 years for burglary.

Paul R. Brown, 34, of 1001 1/2 St., sentenced to 10-20 years for burglary.

#### Manchuria Falls; Chiang May Quit

As the war in Manchuria continues, Chiang Kai-shek may quit, according to a report from the United States.

The report says that Chiang is in a difficult position and may be forced to leave the country.

It also says that Chiang is in a difficult position and may be forced to leave the country.

#### Fog's Gone But Fall Stays

The fog has gone from Pittsburgh, but the fall weather remains. The temperature is in the 40s and 50s, with a light breeze.

The fog has gone from Pittsburgh, but the fall weather remains. The temperature is in the 40s and 50s, with a light breeze.

#### Half-Million Voters in County Will Go to Polls Tomorrow

Upward of a half-million Allegheny County voters will go to the 1948 polls tomorrow. The polls will be held from 7 a. m. to 8 p. m.

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#### On Inside Pages

Business—Finance—20  
Comic Funnies—21  
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Weather—29  
Municipal Society—30

Press Telephones  
Main—4000  
City—4001  
City—4002

**Victory for Dewey Appears Certain**

Here are the final Gallup Poll findings for all 48 states on the presidential race.

"Indicates less than one per cent of vote."

Electoral College vote of each state is shown in parentheses.

It takes 266 electoral votes to win the presidency.

#### Final Standings by States In Gallup Presidential Poll

State	Dewey	Truman	Wilder	Thurmond
Alabama	48	48	4	0
Alaska	1	1	0	0
Arizona	1	1	0	0
Arkansas	1	1	0	0
California	48	48	4	0
Colorado	1	1	0	0
Connecticut	1	1	0	0
Delaware	1	1	0	0
District of Columbia	1	1	0	0
Florida	1	1	0	0
Georgia	1	1	0	0
Idaho	1	1	0	0
Illinois	48	48	4	0
Indiana	1	1	0	0
Iowa	1	1	0	0
Kansas	1	1	0	0
Kentucky	1	1	0	0
Louisiana	1	1	0	0
Maine	1	1	0	0
Maryland	1	1	0	0
Massachusetts	1	1	0	0
Michigan	1	1	0	0
Minnesota	1	1	0	0
Mississippi	1	1	0	0
Missouri	1	1	0	0
Montana	1	1	0	0
Nebraska	1	1	0	0
Nevada	1	1	0	0
New Hampshire	1	1	0	0
New Jersey	1	1	0	0
New Mexico	1	1	0	0
New York	48	48	4	0
North Carolina	1	1	0	0
North Dakota	1	1	0	0
Ohio	1	1	0	0
Oklahoma	1	1	0	0
Oregon	1	1	0	0
Pennsylvania	1	1	0	0
Rhode Island	1	1	0	0
South Carolina	1	1	0	0
South Dakota	1	1	0	0
Tennessee	1	1	0	0
Texas	1	1	0	0
Vermont	1	1	0	0
Virginia	1	1	0	0
Washington	1	1	0	0
West Virginia	1	1	0	0
Wisconsin	1	1	0	0
Wyoming	1	1	0	0

#### Toxic Fumes Believed Cause of 19 Deaths; Hundreds Stricken

At least 19 deaths in Donora smog and pictures, Page 1.

DONORA, Nov. 1.—The heavy pall of fog which brought mysterious death to 19 elderly persons here this week had begun to drift away.

Two separate investigations are under way to stalk the "silent killer" which is believed to be a toxic poison in the fog.

The deadly fog struck first Friday night when hundreds of persons—mostly asthmatics—experienced difficulty in breathing.

Those in weakened conditions, unable to get enough oxygen, were the first to go. And they were still dying yesterday.

Officials of this borough of 13,500 persons took steps immediately to halt the smog.

Rescue Squad Chiefmen, alerted by a report of a death, arrived at a site of emergency and found that victims and witnesses were unable to get enough oxygen to breathe.

Investigations by the State Bureau of Industrial Hygiene and the Health Department are under way to determine the cause of the deaths.

Two scientists from the Pennsylvania State University are working on the fog. They are trying to determine the cause of the deaths.

The fog is believed to be a toxic poison in the fog. It is believed to be a toxic poison in the fog.

#### Tomorrow's Vote Due to Favor GOP

Political analysts expect a victory for the Republican Party in the upcoming election. The GOP is expected to win the presidency and a majority in Congress.

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#### Speak Tonight

Speakers for the evening include several prominent figures. The event is expected to be a major draw for the community.

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#### Donora Fog Samples Tested To Learn How 19 Met Death

Some observers say sulphuric acid in air could have been formed by Mill By-Product. The fog is believed to be a toxic poison in the fog.

Some observers say sulphuric acid in air could have been formed by Mill By-Product. The fog is believed to be a toxic poison in the fog.

#### Starting Today

Wally Falk's cartoon, "Kirk's Around," on the first classified page. A new romantic, mystery serial, "Fools Rush In," by Kathleen Briggs. And the famous Bugs Bunny in his new daily comic strip on the comic pages.

Wally Falk's cartoon, "Kirk's Around," on the first classified page. A new romantic, mystery serial, "Fools Rush In," by Kathleen Briggs. And the famous Bugs Bunny in his new daily comic strip on the comic pages.

**Figure 28:** This article will be included as a flippable paper in the Donora Smog portion of the exhibit and will not include a label.<sup>23</sup>

<sup>23</sup>Asa Atwater, "Donora Smog Deaths Probed," *Pittsburgh Press*, 1 November 1948, accessed 28 March 2019, <https://www.newspapers.com/image/150042084/>.



# "Polluted Air May Cause Cancer," Report on Donora Smog Reveals



**REPORT ON SMOG . . .** Surgeon General Leonard A. Scheele at press conference holds sketch which illustrates how Donora is located in a natural bowl. U. S. Public Health Service has decided death-dealing smog of last year was result of warm, stagnant air which was heavily polluted.

The Donora smog tragedy, which last year killed 22 persons and sickened 6000 others, today led scientists to believe that polluted air may be a possible cause of cancer, heart disease and other dread maladies.

Results of a five-month Federal investigation of the Donora smog disaster, published today, indicate that contaminated air may cause or aggravate many diseases which have baffled research.

Surgeon General Leonard A. Scheele of the Public Health Service, which conducted the survey, said the agency's findings open up "an entirely new field of research into the cause and prevention of disease."

## NO ONE SOURCE—

The 200-page report did not blame any one source for the contamination of the smog. It said fog, weather conditions and the presence of industrial, domestic and railroad fumes contributed to the pollution.

It listed several operations of the American Steel & Wire Co. as "major contributors to the atmospheric load." It added that industrial plants in nearby Monacaen, Clairton, Charleroi and Elrama contributed to the pollution of the air.

It was recommended that special weather precautions be taken to warn residents of the Donora area when weather conditions suitable for the formation of smog are approaching.

In line with this, Dr. Harry Wexler, U. S. Weather Bureau expert, said in an appendix to the report that this month is the critical time for smog in Western Pennsylvania and other parts of the industrial East.

He said deep stagnant masses of air, which become smog when polluted with dust and other particles, are more likely to occur in October than in any other month.

The report said the five-day Donora smog sickened almost 6000 persons. The report was the first disclosure that the effect of the polluted air had been so widely felt. It was believed at first that only several hundred had been made ill by the smog, which resulted in the death of 22 persons.

## NO GUARANTEE—

Wexler said meteorological conditions similar to those at Donora may be expected on an average of once every ten or 15 years. He said there is "no guarantee that they would not occur in consecutive years or months, or twice in the same month."

The Public Health Service report said the Donora smog was the result of an unusual combination of warm, stagnant air and heavily smoke-polluted fog. It said Donora probably had another serious smog period in April of 1945, explaining:

"Vital statistics show there were almost twice as many deaths in the town as in any ordinary April or any ordinary month."

Dr. Steele warned that dangerous air conditions could occur again in Donora or in other highly-industrialized areas. To prevent such a recurrence, Dr. Scheele recommended that: Fog-affected industrial cen-

ters keep a close watch on conditions.

Industrial plants be curtailed or closed when smog conditions appear to be developing. In order to reduce sharply the contamination of air.

The Weather Bureau said the condition that helps make a smog and turn it into a killer—as at Donora—is termed an "anticyclone." The "anticyclone" is what its name implies, the opposite of a cyclone, or a deep mass of stagnant air.

Dr. Wexler said a cold "anticyclone" and a warm "anticyclone" met near Donora, hovering over the area the five days in which the death-dealing smog existed.

## LONG RANGE—

Federal Security Administrator Oscar R. Ewing, at a news conference after the report was released, called for immediate attention to the long-range national problem of air pollution. He said Federal, state and local agencies must co-operate with industries on pollution control in each industrial city and town. He added:

"We must now determine the extent to which the health of people living in these communities month after month, year after year is affected by air contamination even though an acute episode, such as that which gripped Donora, may never occur."

Ewing said the year-long investigation of the Donora smog took the full time of 25 Public Health Service experts in industrial hygiene.

## Donora Probes Smog Report

DONORA, Pa., Oct. 14.—Borough and health officials today still were reviewing the U. S. Public Health Service report on Donora's fatal smog.

Burgess August Chabon said he would call a special council meeting after he has studied the report. He said a weather station has been set up, along with an emergency committee to take precautions against another smog. Such precautions might include closing of the American Steel & Wire Co. during "critical" periods, according to Burgess Chabon.

But the burgess said the firm had made enough changes in its process to cut on the discharge of gases.

## Ex-Pitt Professor Receives Award

Dr. Charles Glen King, former Pitt professor and now a faculty member of Columbia University, will receive the John Scott Award of the City of Philadelphia at a meeting of the Pittsburgh section of the American Chemical Society in Mellon Institute tonight. The award will recognize his work on the chemistry of Vitamin C.

For News of the World in Pictures, turn to First Page, Second Section, daily Sun-Telegraph.

**GUARANTEED**  
**INNERSPRING**  
**MATTRESS AND**  
**BOX SPRING**  
**2 pieces \$39.50**  
**TAYLOR BROS. CO.**  
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The Mattress Store 1935

# GIMBE

## Tomorrow Is "Sweet"

Saturday, October

Remember to Make Someone Happy with  
Candy Made in Our 13th Floor Kitchens

1 Lb. Annaclairs\*

1.50

Pittsburgh's favorites: vanilla cream center  
rolled in rich chocolate coating filled with  
pecans. Also 2 and 3 lb. boxes. \*Reg.

**Figure 30:** This article will be included as a flippable paper in the Donora Smog portion of the exhibit and will not include a label.<sup>25</sup>

<sup>25</sup> "Polluted Air May Cause Cancer, Report on Donora Smog Reveals," *Pittsburgh Sun-Telegraph*, 14 October 1949, accessed 28 March 2019, <https://www.newspapers.com/image/524997900/?terms=donora%2Bsmog>.



**Figure 31:** This article will be included as a flippable paper in the Donora Smog portion of the exhibit and will not include a label.<sup>26</sup>

### Subsection III: Air Toxicity and the Clean Air Act

The third portion of the air toxicity section will fall upon the last wall where a brief history of the creation of the Clean Air Act will be revealed. This means that, following the route, the audience will see a plaque explaining how these toxicity events culminated in a piece of legislation that is essential to conservation and personal health. Some additional information displayed on this wall will include images related to the Clean Air Act, newspaper clippings (not

<sup>26</sup> "2 Donora Smog Victims Who Took Trip South Die Within 24 Hours," *Pittsburgh Press*, May 6, 1949, accessed 28 March 2019, <https://www.newspapers.com/image/143369114/>.

interactive), and a bookcase below the exhibit which will feature books about air pollution. The books on the shelf will include titles such as *When Smoke Ran Like Water*, *Smogtown: The Lung-Burning History of Pollution in Los Angeles*, *Choked: Life and Breath in the Age of Air Pollution*, *The People's Republic of Chemicals*, *Something New Under the Sun*, *Man and Nature or Physical Geography as Modified by Humans*, *Climate Change and the Course of Global History*, and *The Ends of the Earth*.<sup>27</sup> The plaque on the legislation shall read:

The Clean Air Act is a unique piece of legislation which has undergone many transitions throughout the years. As a direct result of air toxicity events in Donora, Los Angeles, and other American cities, the government's Environmental Protection Agency first approved funding into researching air pollution with the Air Pollution Control Act of 1955. This was later modified to create the Clean Air Act of 1963 which generated federal programs to research monitoring and controlling air pollution. Then, in 1967, the government enacted the Air Quality Act which monitors and regulates the amount of pollution in the atmosphere. The Clean Air Act of 1970 authorized and maintained multiple sets of accountability standards for companies and generated enforcement teams. Finally, the amendments of 1977 and 1990 increased regulations for disposal of toxic chemicals and established a program to phase out the use of chemicals that deplete the ozone layer.

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<sup>27</sup> Devra Davis, *When Smoke Ran Like Water: Tales of Environmental Deception and the Battle Against Pollution* (New York, NY: Basic Books, 2004).

Chip Jacobs and William J. Kelly, *Smogtown: The lung-burning history of pollution in Los Angeles* (New York, NY: The Overlook Press, 2008).

Beth Gardiner, *Choked: Life and Breath in the Age of Air Pollution* (Chicago, IL: The University of Chicago Press, 2019).

Chip Jacobs and William J. Kelly, *The People's Republic of Chemicals* (Los Angeles, CA: A Genuine Vireo Book/Rare Bird Books, 2014).

J.R. McNeill, *Something New Under the Sun* (New York: W.W. Norton & Company Ltd, 2001, c2000).

George Perkins Marsh, *Man and Nature: Or Physical Geography as Modified by Human Actions* (Scotts Valley, CA: CreateSpace Independent Publishing, LLC, 1864, c.2018).

John L. Brooke, *Climate Change and the Course of Global History: A Rough Journey* (New York: Cambridge University Press, 2014).

Donald Worster ed., *The Ends of the Earth* (New York: Cambridge University Press, 1988).



The health information section will display the following:

According to the American Lung Association, lung cancer is the number one killer of men and women in the United States. Although many people tend to associate smoking with higher risk factors, a significant amount of studies have shown that air pollution can cause lung cancer. While these effects are mostly seen in low and middle income countries which are overpopulated, such as China where an 8 year old girl contracted lung cancer, cases have been present in the smoggier cities of the United States. While the rates here are lower due to regulative legislation like the Clean Air Act, there is still much that can be done to eradicate pollution induced cancer completely.

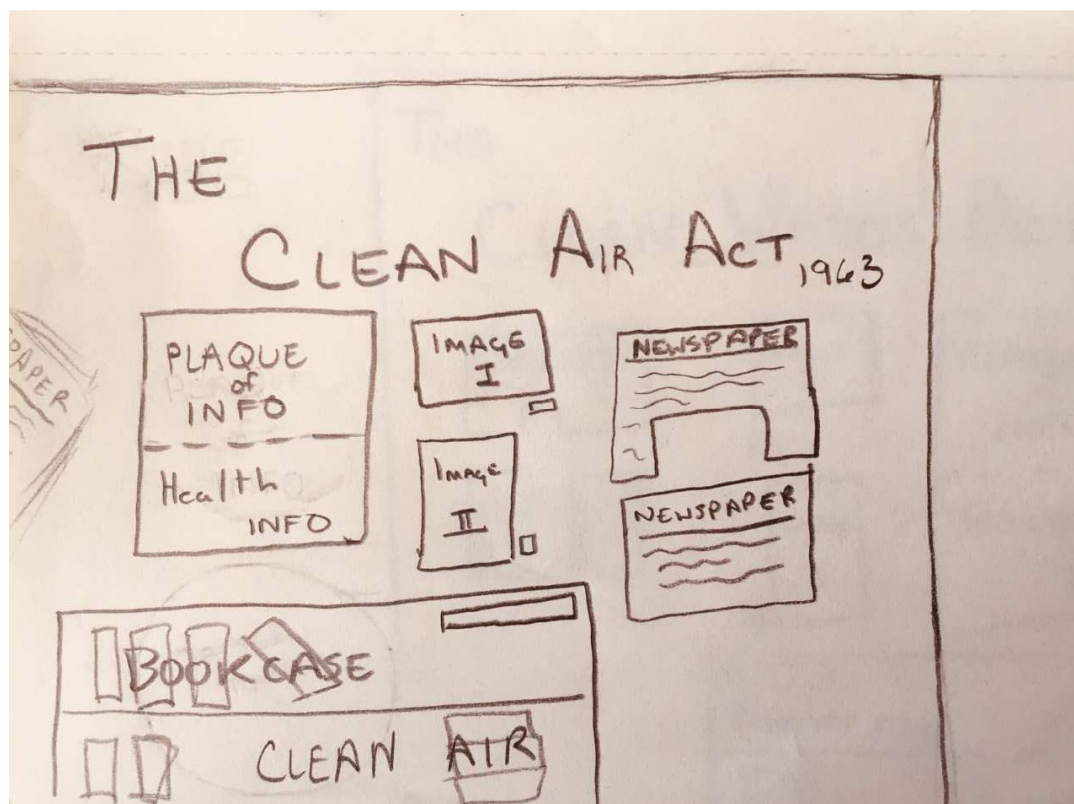


Figure 32: Clean Air Act Room

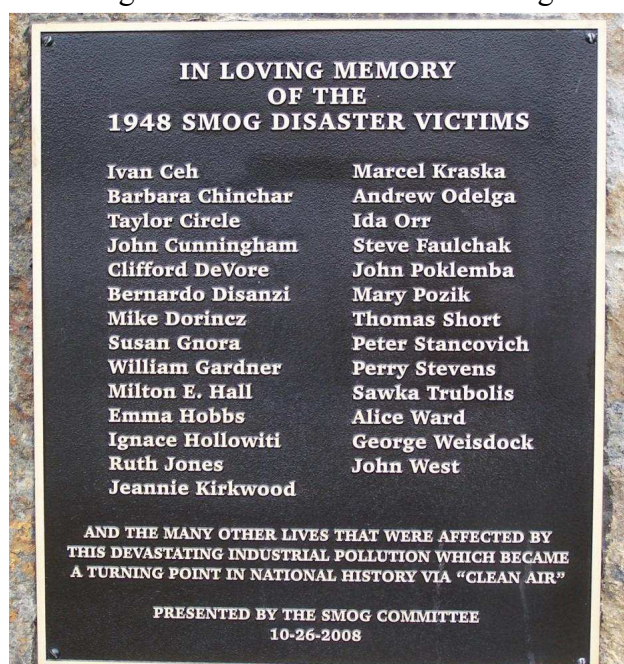


EPA Administrator William D. Ruckelshaus and President Richard Nixon at the signing of the Clean Air Act, December 31, 1970. (Remington's painting of Teddy Roosevelt in "The Assault of San Juan Hill" in background.)

### Figure 33: Image I

[This image will be presented without the caption on the image. The label will read as follows:]

On 31 December 1970, EPA Administrator William D. Ruckelshaus and President Richard Nixon signed the Clean Air Act and changed our nation's air for the healthier.<sup>28</sup>



### Figure 34: Image II

This replica plaque serves as a reminder of all the lives that were lost before we had effective legislation preventing air pollution. May it serve as a reminder that we must stay aware of our impact upon the environment.

*Donora Smog Museum*<sup>29</sup>

<sup>28</sup> "Ruckelshaus and Nixon signing," *Donora Smog Museum* (picture, Donora, PA, 1970).







## FROM SPACE

## Is Earth Receiving Signals?

By George Getze

Times Science Writer

Signals from intelligent beings living on planets far out in space may even now be on their way to earth, a Pasadena scientist told an audience of physicists at Caltech Saturday.

The signals would be beams of light—LASER signals—Johnston, of the Electro-Optical Systems Corp., told the Caltech meeting.

Ward to Arrivals

LASER is an acronym, or made-word, formed by combining the words "light amplification by stimulated emission of radiation."

Johnston said certain stars emit beams of light years from earth could serve as amplifying relay stations for the LASER signals. He said they show many of the conditions necessary for intelligent life to exist.

"To go a step further, suppose intelligent beings notice this amplification of light," he said.

"They could lead the LASER signal into this nebula and then hope another intelligent society would think to look there to pick it up."

Johnston said he has suggested that various nebulae be scanned by radio and optical telescopes regularly. He said the project would cost about \$100,000.

Life Held Probable

The wave length of ionized hydrogen would be the logical place to look, according to Johnston, since ionized hydrogen is the most abundant element in the universe.

Scientists have already found it mathematically and theoretically probable that intelligent life, able to communicate across space, must exist elsewhere in the universe.

But they have not been certain how to look for possible signals. Attempts to pick them up at random by means of radio telescopes have failed.

Carbon Monoxide Spewed

Motor vehicles spew out daily 500,000 lbs. of carbon monoxide, at least 60 million fourth of the earth's atmosphere.

Ground stations at Wallops Island, Va. Greenbelt, Md. and Princeton, N.J., turned on receiving gear and off.

These numbers have grown pictures were beamed from the earth to the moon.

The photos showed clouds, and molecular quantum cover patterns, including a cold front moving in from the Atlantic Ocean, over a wide area of eastern Canada.

There would be no problem, as when the pollutants were dispersed evenly in the atmosphere. But they are concentrated primarily in the atmosphere.

This important coverage starts Thursday in The Times.

## U.S. Moves to Combat Increasing Air Pollution

Federal Government Given New Powers as Contamination Bill Hits \$11 Billion Year

By Robert C. Tully, Times National Science Writer

WASHINGTON—There is nothing small about the air pollution problem in this country except efforts to solve it.

Estimates of the size of the problem may be somewhat on the high side since they have been made by persons and groups intent on getting more done about it. Even with that qualification the problem is staggering.

One measure is economic loss from dirty air. It is about \$1 billion a year. This is about \$45 for every American.

Another measure is the loss of life. It is estimated that 100,000 people die each year from air pollution.

It was also authorized money to do the work.

Negative Blessing

Air pollution is one of those negative blessings of civilization and higher standards of living. It is primarily an urban problem, although it also causes a significant loss—about \$500 million—to agriculture.

Pollution increases faster than population. The by-product of making that energy is contamination in the form of light, gases and solids.

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## Johnson Asks Study of How Defense Cuts Affect Economy

## High-Level Committee to Be Set Up

WASHINGTON (UPI)—President Johnson Saturday ordered the heads of nine government departments and agencies to establish a high-level committee to study the impact of changes in defense spending and disarmament on the nation's economy.

His proposal was an outgrowth of informal work begun June 10 by Chairman Walter W. Haller of the Council of Economic Advisors.

A member of the council will serve as chairman of the new committee.

The Defense Department already has ordered 26 domestic and seven overseas military installations closed as no longer necessary.

In a memorandum to the government leaders, Mr. Johnson said the committee should try to improve understanding of the economic impact of defense expenditures and of changes either in the composition or in the level of such expenditures.

Federal outlays for defense are of such magnitude and importance that they have major economic significance," the memorandum said.

In certain regions of the nation and in certain communities they provide a significant share of total employment and income.

It is therefore important that we improve our knowledge of the economic impact of such spending, so that appropriate action can be taken—in co-operation with state and local governments, private industry and labor—to minimize potential disturbances which may arise from changes in the level and pattern of defense outlays.

In a separate statement the President said he was confident that the U.S. economy could adjust to changes in defense spending or arms reduction.

"Our experiences after World War II and the Korean conflict prove that the economy can adjust to changes in the level and pattern of defense outlays."

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BIRTHDAY PICTURE—The First Lady poses for photograph on the eve of her 51st birthday, taking time out from her preparations for Christmas activities.

## Congress to Pentagon: Build Atom Fleet Now

Joint Committee Hires McNamara Decision on Conventional Carrier as Security Peril

WASHINGTON (UPI)—The Joint Congressional Atomic Committee demanded Saturday that a Pentagon decision to build a conventionally propelled aircraft carrier be overturned and that all future major warships have nuclear power.

Defense Secretary Robert McNamara's present opposition to building atomic surface warships, the group said, may commit the Navy to a future of planned obsolescence with grave implications for national security.

A report from the committee branded McNamara's arguments in support of an oil-burning carrier as "misleading," "misinformed" and "thorough."

McNamara's present opposition to building atomic surface warships, the group said, may commit the Navy to a future of planned obsolescence with grave implications for national security.

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## Mrs. Johnson Observes 51st Birthday Today

WASHINGTON (UPI)—Mrs. Lyndon B. Johnson, wearing a cherry red dress, posed for photographers in her sitting room Saturday to mark her 51st birthday and wished them all a Merry Christmas.

Earlier in the day it was revealed that the President brought his brown-haired wife a red hosiery gown and presented it to her last week—several days before her birthday. Her birthday is today.

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## SKEPTICS COULDN'T STOP HIM

## Disillusioned Santa Reconsiders; Returns to Gladden Young Hearts

By Jerry Cohen

The dolefuly tell, the sleigh bells' tinkle and that splendid "Ho, Ho, Ho" could mean but one thing.

Santa Claus had returned to Mrs. Cohen Terrace.

He had vowed not to come back this Christmas time.

But his heart, wounded by a callous few in the neighborhood, had yearned out to be too soon to see him.

Overlooking San Pedro

And to residents of the picturesque hillside community overlooking San Pedro Harbor, his suit never seemed redier nor his "Merry Christmas" cheerier than they do these holiday nights.

Inside a typical neighborhood home, the William A. McKee's at 2048 Dorado Dr. Santa rumped through a scene he has enacted for six Christmas past and which he will continue to play through this Christmas Eve.

"A Merry Christmas to all," he shouted as he stomped into a living room, aglow with the soft lights of a corner tree and the radiance from three small fires.

David J. Donald, 4, and Joan McKee, 2, gaped as their elders acknowledged Santa's greeting.

Then their moment arrived. The mystery Santa, whose identity is known to only a few, handed each a big candy cane from his bagging pack.

They shake my hand, Santa," said Donald.

ing all your milk? Have you been brushing your teeth? Have you been a good boy?" Santa asked.

"Yes, yes, yes."

Only then did Santa shake Donald's hand.

Before he left to visit the next home on the block, Santa warned:

At Next Home

"Don't eat all the candy before bed. Wrap some of it in paper and save it for tomorrow."

"And if you're good children, I'll be back Christmas Eve."

At the next home—and the next and the next—the jolly ritual was repeated. Sometimes with variations. But always with an air of mystery that makes the Santa Claus of Mrs. Cohen Terrace something special.

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## TIMES MEN TO REPORT U.S. IMPACT ON SCIENCE

A topic that concerns science and research throughout the country—The Federal Government, Science, and the Universities—will be one of the general subjects discussed when 6,000 scientists gather in Cleveland this month.

Starting Thursday, Dr. Irving Bengeckoff, Times science editor, Robert Tully, Times national science writer, and Harry Nelson, Times medical editor, will report on the subject as well as some of the specific research presented at the annual meeting of the American Assn. for the Advancement of Science.

Symposiums and lectures are scheduled to run the scientific games from astronomy to medicine and zoology. Times experts will analyze and interpret what some of this important research can mean to people everywhere.

This important coverage starts Thursday in The Times.

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**10 Sec. A—SUN, DEC. 22, 1963** **Los Angeles Times**

## AIR POLLUTION

**Continued from Page 8**

Under the new provisions, the secretary can call a conference of all state and local air pollution control agencies to discuss the problem of air pollution in the country as a whole. The secretary will have at least six months to make a study of the problem, and a report will be made to the public. The secretary will also have the power to call a conference of all state and local air pollution control agencies to discuss the problem of air pollution in the country as a whole. The secretary will also have the power to call a conference of all state and local air pollution control agencies to discuss the problem of air pollution in the country as a whole.

**TIROS 8**

**Continued from Page 8**

There were no exact figures on the quality of the air in the city, but the report said that the air was "fairly good" in most areas. The report also said that the air was "fairly good" in most areas. The report also said that the air was "fairly good" in most areas.

**SCRANTON**

**Continued from First Page**

Scranton has a long history of being a coal-mining town. The town has a long history of being a coal-mining town. The town has a long history of being a coal-mining town.

**Rockefeller Drive Set**

**MONTICELLO, N.Y. (UPI)**—Anthony J. Rockefeller, governor of New York, today announced that he would like to see a new highway built from Monticello to the town of Rockefeller.

**Santa gives gift slippers from Gallenkamp's**

**OPEN NIGHTS 'TIL 9**

**Charge With Your Bankcard**

**OVER 200 STORES TO SERVE YOU — 60 IN THIS AREA**

**GALLENKAMP'S** Shoes for the entire family

**Infant's fur collar slipper boot with soft padded sole, cotton fleece lining and washable vinyl upper, in white with light blue or white with red. Sizes 3 to 6. \$1.99**

**Women's 6 1/2" high genuine abalone with long hair shaggy boot with soft padded sole, in light blue, red, woodrose or gold. Sizes 4 to 10. \$4.99**

**Women's and girl's fur slush boot with genuine leather sole, in light blue, red, woodrose or gold. Sizes 4 to 10. \$2.99**

**Women's and girl's hand crocheted wool boot with genuine leather sole, in light blue, red, woodrose or gold. Sizes 4 to 10. \$3.99**

**Women's and girl's fur slush boot with genuine leather sole, in light blue, red, woodrose or gold. Sizes 4 to 10. \$1.99**

**Women's and girl's fur slush boot with genuine leather sole, in light blue, red, woodrose or gold. Sizes 4 to 10. \$3.99**

**Men's elastic side gored over-the-calf slipper, fully worn-lined with genuine sheepskin lining, in light blue, red, woodrose or gold. Sizes 6 to 12. \$5.99**

**Men's soft leather slouching boot with hand-stitched sole and upper. Fully worn-lined. Sizes 6 to 12. \$6.99**

**Men's camp shoe of tan glove leather with genuine leather sole, in light blue, red, woodrose or gold. Sizes 6 to 12. \$4.99**

**Women's Turkish toe cuff slipper with genuine leather sole, in light blue, red, woodrose or gold. Sizes 6 to 12. \$2.99**

**Men's and boy's cap-toe side gore oxford, fully worn-lined with genuine sheepskin lining, in light blue, red, woodrose or gold. Sizes 6 to 12. \$3.99**

**Boy's fur cuff moccasin with adjustable drawstring, in genuine leather sole and sole and lined with real cotton fleece. In light blue. Sizes 7 to 9. \$1.99**

Figure 36:

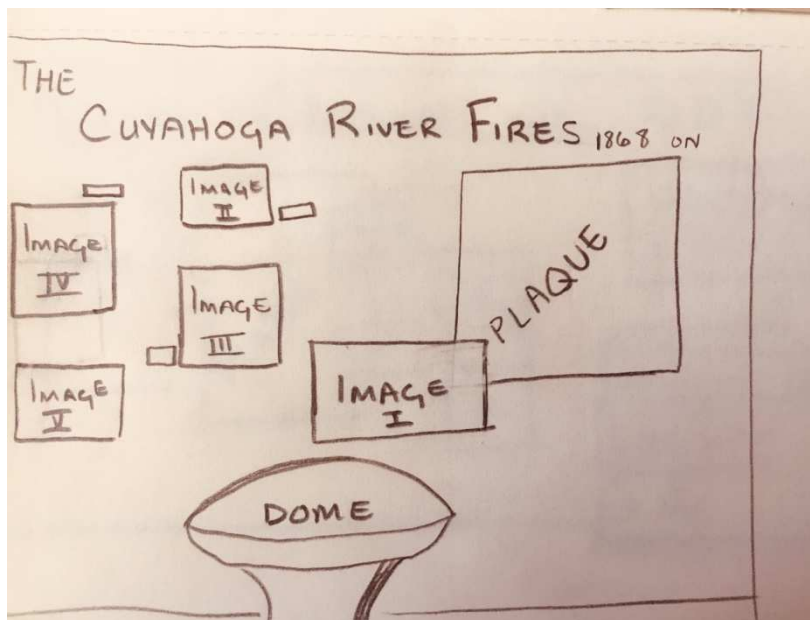
This two page article about pollution written in the *Los Angeles Times* in 1963 discusses the passage of the Clean Air Act and its impact.<sup>31</sup>

<sup>31</sup> Robert C. Toth, "Pollution," *Los Angeles Times*, 22 December 1963, accessed 29 March 2019, <https://www.newspapers.com/image/381535754/?terms=clean%2Bair%2Bact>.

**Subsection IV: Water Toxicity and the Cuyahoga River Fire**

Akin to the air toxicity section, the water toxicity section will also be separated into three distinct pieces. First, there will be the information of Cuyahoga River fires. This will include images of the various fires that have happened on the notable river in Ohio and a plaque explaining what happened. Mirroring the air pollution side, there will also be a model in this room related to water toxicity. It will be a miniature version of the Cuyahoga River as it flows through Cleveland. The river will then have a mock fire burning to the scale of over five stories tall. This feature will also be made of as many recycled or repurposed materials as possible. It will utilize fake fire, by way of paper, colored lights, and wind, in order to show the flames in an eco-friendly way. It will also use a recycling water vapor system as smoke instead of actual smoke. There will be an accompanying label explaining more detail about the fire, including the height of the blaze. The plaque for the main exhibit reads as follows:

For numerous years, Cleveland, Ohio was an epicenter for manufacturing in the United States. However, lack of regulations on waste disposal resulted in the Cuyahoga River becoming a dumping ground for chemicals and other detritus. Soon, the reputation of the beautiful flowing waters of Ohio became synonymous with being the most polluted waterway in the United States. From 1868 onward, the Cuyahoga River caught fire on over 13 separate occasions. The fire of 22 June 1969 was the one garnering the most media attention. It reached heights of over five stories and caused \$50,000 in damages. However, the most destructive fire was the one which took place in 1952 and caused over \$1.3 million in damages. 1912 marked the most fatal of the fires in which five people lost their lives.



**Figure 37: Cuyahoga River Fire Wall**



**Figure 38: Image I**

This is the Cuyahoga River fire of 1952 which caused over \$1.3 million in damages.

*Michael Schwartz Library*<sup>32</sup>

<sup>32</sup> "Cuyahoga River fire, 1952 - Jefferson St. and W. 3rd.," *The Michael Schwartz Library at Cleveland State University*, accessed 22 April 2019, <http://images.ulib.csuohio.edu/cdm/singleitem/collection/press/id/605/rec/8>.





**Figure 39: Image II**

This shows the Cuyahoga River fire of 1948 as seen from the Clark Avenue Bridge.

*Michael Schwartz Library*<sup>33</sup>



**Figure 40: Image III**

This depicts the Cuyahoga River fire of 1952 as seen from Jefferson St. & W. 3<sup>rd</sup>.

*Michael Schwartz Library*<sup>34</sup>

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<sup>33</sup> "Cuyahoga River fire, 1948," *The Michael Schwartz Library at Cleveland State University*, accessed 22 April 2019, <http://images.ulib.csuohio.edu/cdm/singleitem/collection/press/id/599/rec/3>.



**Figure 41: Image IV**

This image from 1961 shows a fireboat attempting to break up oil slick on the Cuyahoga River. *Michael Schwartz Library*<sup>35</sup>



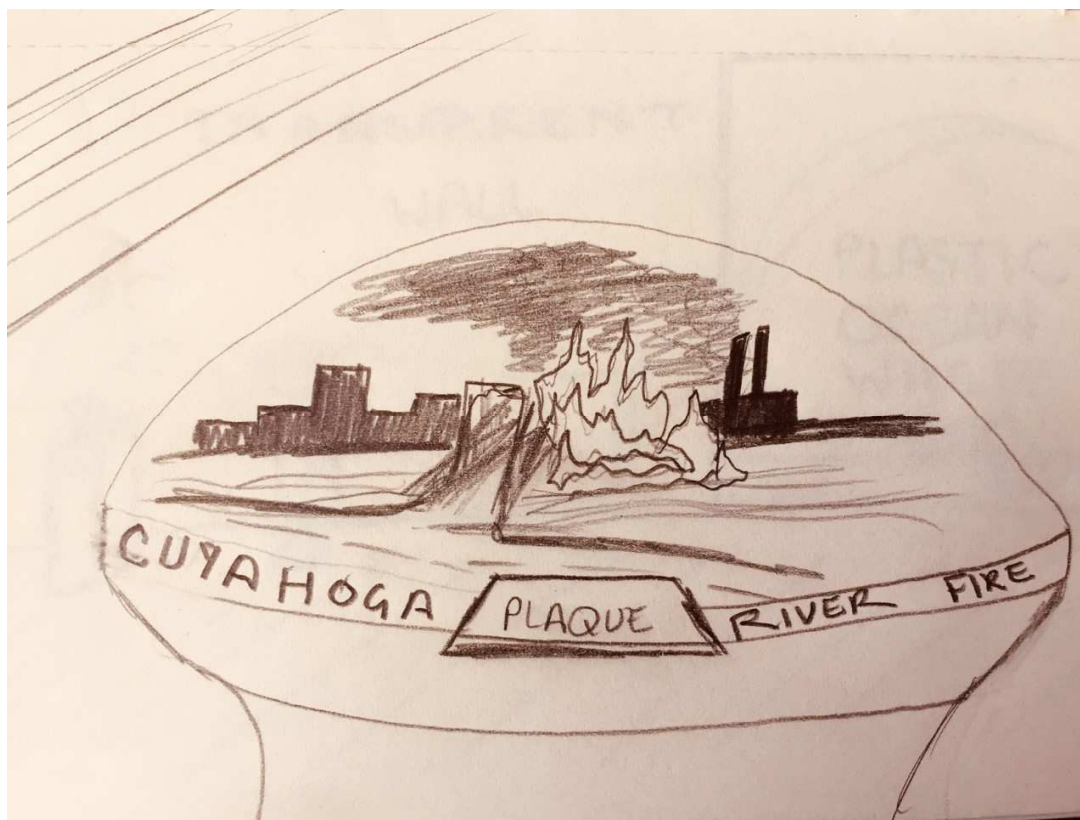
**Figure 42: Image V**

Councilman Katalinas, Henry Sinkiewicz and John Pilch from Cleveland are examine a cloth that came up dripping with oil after being dipped in the Cuyahoga River in 1964. *Michael Schwartz Library*<sup>36</sup>

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<sup>34</sup> “Cuyahoga River fire, 1952, Jefferson St. & W. 3rd,” *The Michael Schwartz Library at Cleveland State University*, accessed 22 April 2019, <http://images.ulib.csuohio.edu/cdm/singleitem/collection/press/id/603/rec/1>.

<sup>35</sup> “Fireboat breaking up oil slick on the Cuyahoga River, 1961,” *The Michael Schwartz Library at Cleveland State University*, accessed 22 April 2019, <http://images.ulib.csuohio.edu/cdm/singleitem/collection/press/id/598/rec/4>.



**Figure 43: Cuyahoga River Fire Dome**

This model, to scale, shows the height of the flames during the 1969 fire which reached over 5 stories high.

### **Subsection V: Water Toxicity, Rachel Carson, and DDT**

Next, the second wall will have information about toxic waste, such as DDT, and will accentuate work done by scientist and advocate Rachel Carson on pollution. There will be photographs related to the spraying of DDT, bioaccumulation, and an old advertisement for a surprising use of the chemical compound. There will also be primary source material about Rachel Carson herself in the form of a manuscript for her famous book *Silent Spring*, a photograph, a newspaper article, and the preserved robins she used as part of her research into

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<sup>36</sup> "Councilman Katalinas, Henry Sinkiewicz and John Pilch examine cloth soaked in oil from the Cuyahoga River," *The Michael Schwartz Library at Cleveland State University*, accessed 22 April 2019, <http://images.ulib.csuohio.edu/cdm/singleitem/collection/press/id/10772/rec/13>.

chemicals and the environment. For an interactive piece, the middle of this exhibit space shall include a large cylindrical tube of water that the audience can walk around. Inside the water tube, at around 3-4 feet high, will be various visible liquid contaminants. It will be accompanied by a label explaining that contaminants lurk within our water supply. There will also be a large plaque in this area featuring more information about Carson and her contributions to science and the movement. The plaque for this section shall read as follows:

Rachel Carson (1907-1964)

Rachel Carson was a marine biologist with the U.S. Fish and Wildlife Service, an author, and a conservationist. In 1962 she wrote the book *Silent Spring* where she research and presented her findings on chemicals and their environmental impact. Most notably, Carson exposed the pesticide Dichlorodiphenyltrichloroethane, better known as DDT, as being one of the most dangerous chemicals to our environment. DDT was found to be cumulatively poisonous to many animals and had a softening effect on egg shells. The latter almost led to the extinction of our national bird, the bald eagle. Carson's book was so inspiring that it is credited with spawning the modern environmental movement and inspiring the government to ban DDT for good in 1972.

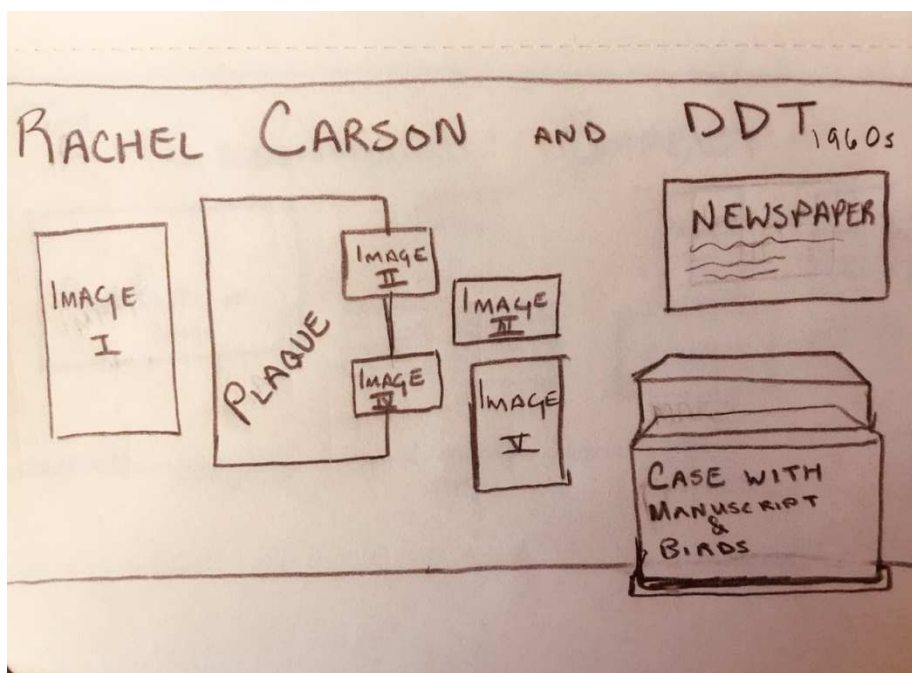


Figure 44: Rachel Carson Wall



**Figure 45: Image I**

Rachel Carson with Microscope, 1962

*Chatham University Collection on Rachel Carson*<sup>37</sup>

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<sup>37</sup> “Rachel Carson with Microscope,” *Chatham University Collection on Rachel Carson* via Artstor, accessed 22 April 2019, [https://library.artstor.org/#/asset/SS37858\\_37858\\_43400806;prevRouteTS=1553118046503](https://library.artstor.org/#/asset/SS37858_37858_43400806;prevRouteTS=1553118046503).



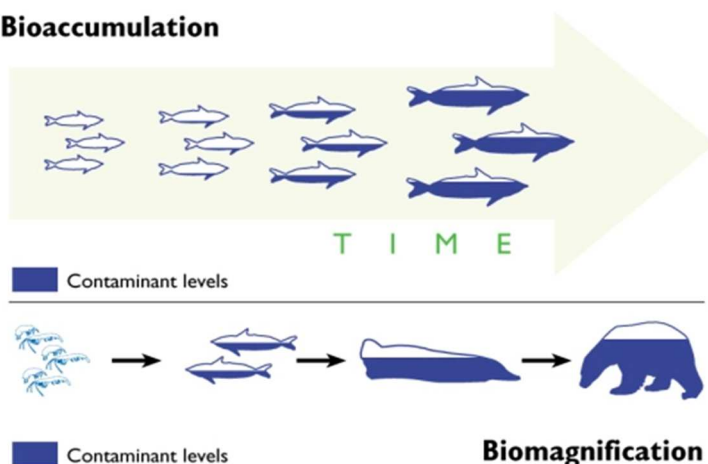


**Figure 46: Image II**

This picture from 1955 shows a Ford tri-motor spraying DDT during a western spruce budworm control project in Oregon. Sprays like this caused countless animals beyond the target bugs to be exposed to large doses of DDT.

*USDA Forest Service.*<sup>38</sup>

#### Bioaccumulation



#### Biomagnification

**Figure 47: Image III**

Bioaccumulation chart which shows how contaminants are magnified as things higher up the food chain consume other exposed animals. Eating animals high in DDT caused bald eagles to create eggs with soft shells. These shells were more susceptible to breakage which resulted in the death of the chicks and caused the entire population to dwindle.

*World Wildlife Federation*<sup>39</sup>

<sup>38</sup> “1955. Ford tri-motor spraying DDT. Western spruce budworm control project. Powder River control unit, Oregon,” *USDA Forest Service* via *Flickr*, accessed 22 April 2019, <https://www.flickr.com/photos/151887236@N05/33059292645/in/photostream/>.



**Figure 48: Image IV**

A group of men are spraying DDT on crops. While effective, the DDT would easily make it into many other species via bioaccumulation.<sup>40</sup>



**Figure 49: Image V**

This advertisement from an issue of *Women's Day* in 1947 uses Disney images to convince parents to protect their children from insects with DDT paper. Little did they know that this wallpaper was a far greater harm to their children than insects. DDT also put mothers in danger. Studies have shown that exposure quadruples breast cancer risk.

*Science History Institute*<sup>41</sup>

<sup>39</sup> "Bioaccumulation Chart," *World Wildlife Federation*, accessed 22 April 2019, [http://assets.panda.org/img/original/bioaccumulation\\_graphic.jpg](http://assets.panda.org/img/original/bioaccumulation_graphic.jpg).

<sup>40</sup> Melissa Breyer, "DDT exposure quadruples breast cancer risk," *Treehugger*, 17 June 2015, accessed 22 April 2019, <https://www.treehugger.com/sustainable-agriculture/ddt-exposure-quadruples-breast-cancer-risk.html>.

<sup>41</sup> "Protect Your Children Against Disease-Carrying Insects!," *Science History Institute*, accessed 22 April 2019, <https://digital.sciencehistory.org/works/mg74qm295>.



**Figure 50:** Rachel Carson's Robins

These are the robins of George Wallace, a friend to Carson who contacted her over the concern of their dying out. After some experiments, it was found that the birds died after eating worms filled with DDT. Carson was so struck by the event that she continued her research, culminating evidence against DDT and other pesticides, and was inspired to write *Silent Spring*. *Michigan State University Museum*.<sup>42</sup>

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<sup>42</sup> Jianguo "Jack" Liu , Thomas Dietz , Layne Cameron , Sue Nichols , Richard Snider, "ON EARTH DAY, CELEBRATE SILENT SPRING'S 50TH ANNIVERSARY," *Michigan State University*, 20 April 2012, accessed 22 April 2019, <https://msutoday.msu.edu/news/2012/on-earth-day-celebrate-silent-spring/>.

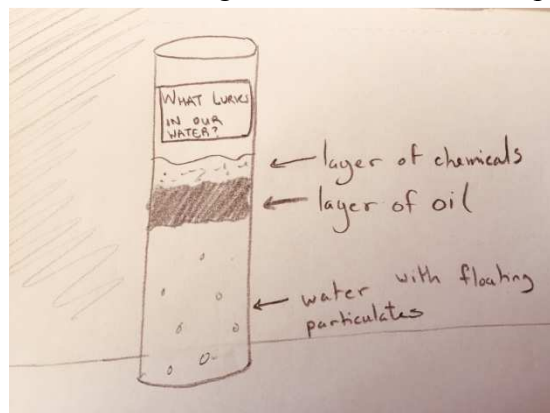
"MSU Museum," *Michigan State University*, accessed 22 April 2019, <https://www.museum.msu.edu/>.





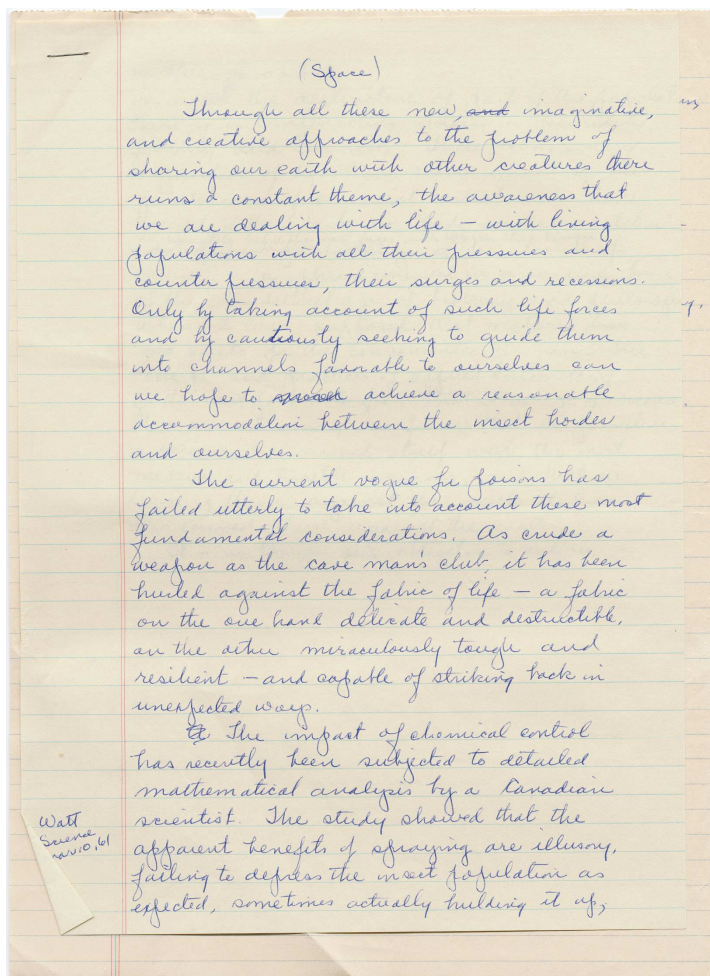
**Figure 51: Rachel Carson Newspaper Clipping**

This newspaper article from the *Daily News* in New York, circa 19 May 1963, addresses Rachel Carson's finding from *Silent Spring* and that despite the dangers, there had still been a pesticide boom. It challenged the reader to contemplate the logic of such unsafe choices.<sup>43</sup>



**Figure 52: Polluted Water Structure**

<sup>43</sup> "SCIENCE: Experts Sound a Warning- Bug-Bombs Can Be Lethal Too," *Daily News* (New York, NY), 19 May 1963, accessed 28 March 2019, <https://www.newspapers.com/image/458100948/?terms=ddt%2Brachel%2Bcarson#>.



**Figure 53:** This is a page of Rachel Carson's manuscript for the book *Silent Spring*. Without her tireless devotion to understanding and exposing the dangers of chemical pesticides through this book, it is entirely possible that some animals would have gone extinct and our drinking water supply would be contaminated.

*Beinecke Rare Books & Manuscript Library*<sup>44</sup>

Next to this will be another plaque asking visitors to take a picture with their phone so that they can have free online access to the entirety of *Silent Spring*.<sup>45</sup>

<sup>44</sup> "(Space) Through all these new imaginative and creative approaches to the problem ..." [Page from Chapter XVII of *Silent Spring*.] From: Rachel Carson papers," *Beinecke Rare Books & Manuscript Library*, accessed 22 April 2019, [https://brbl-dl.library.yale.edu/vufind/Record/3521090?image\\_id=1023491](https://brbl-dl.library.yale.edu/vufind/Record/3521090?image_id=1023491).

<sup>45</sup> Rachel Carson, "Full Text of *Silent Spring*, *Internet Archive*, accessed 22 April 2019, [https://archive.org/stream/fp\\_Silent\\_Spring-Rachel\\_Carson-1962/Silent\\_Spring-Rachel\\_Carson-1962\\_djvu.txt](https://archive.org/stream/fp_Silent_Spring-Rachel_Carson-1962/Silent_Spring-Rachel_Carson-1962_djvu.txt).

## Subsection VI: Clean Water Act

The last section of The Visible portion of the exhibit will feature a wall dedicated to the Clean Water Act and will show how events such as those depicted contributed to the development of the act and further legislation protecting our drinking water and public water spaces. This will include some images, newspaper clippings, and political cartoons. Some additional information included in this exhibit will discuss the importance of clean drinking water. There will also be data discussing the deleterious effects of contaminated water on health and safety. A bookcase will be included in this section displaying works related to water pollution which will serve to inspire the public to read further on the subject if they are so interested. These books will include titles like *Silent Spring*, *Field Notes from a Catastrophe*, *The Sixth Extinction: An Unnatural History*, *Flight Ways: Life and Loss at the Edge of Extinction*, *Coral Reefs: A Very Short Introduction*, and *Seasick: Ocean Change and the Extinction of Life on Earth*.<sup>46</sup> The main plaque for this area shall state:

As a direct result of the grand scale pollution seen in the Cuyahoga River and the dangerous discoveries of leading scientists, such as Rachel Carson, the government again decided that measures must be taken to protect American citizens and the environment at large. The United States has been working to protect our waterways since the Rivers and Harbors Act of 1862 when the president authorized the cleaning out and deepening of selected waterways. In 1948, additional legislation was passed to address pollution in the

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<sup>46</sup> Rachel Carson, *Silent Spring* (Boston: First Mariner Books, 2002).

Elizabeth Kolbert, *Field Notes From a Catastrophe: Man, Nature, and Climate Change* (New York: Bloomsbury, 2006).

Elizabeth Kolbert, *The Sixth Extinction: An Unnatural History* (New York: Picador, 2014).

Thom Van Dooren, *Flight Ways: Life and Loss at the Edge of Extinction* (New York: Columbia University Press, 2014).

Charles Sheppard, *Coral Reefs: A Very Short Introduction* (Oxford, UK: Oxford University Press, 2014).

Alanna Mitchell, *Seasick: Ocean Change and the Extinction of Life on Earth* (Chicago: The University of Chicago Press, 2009).

Federal Water Pollution Control Act in order to eliminate or reduce pollution in all waterways. This was later amended in 1972 to become what is now known as the Clean Water Act. Amendments included pollution control programs, regulations for waste dumping, funding enhanced sewage facilities, and making it illegal to discharge any pollutant into navigable waters.

The health information portion of the plaque shall read:

Water pollution is extremely dangerous and often deadly. As our nation's drinking supply comes from natural sources, it is essential that there is vigilance in keeping the sources clean. However, industrialized facilities, corporate bodies, and chemical plants are not always considerate in their storage and waste disposal practices. Currently, two Tennessee environmental groups are suing the Gallatin Fossil Plant for their coal ash pits which have been leeching contaminants such as including arsenic, lead, and mercury into the Cumberland River where Nashville gets their drinking supply. In New Jersey, the governor is calling for a massive cleanup due to 1 in 5 residents are receiving water contaminated with polyfluoroalkyl substances, which are a group of highly toxic man-made chemicals. In both these cases, the contaminants listed have been directly linked to cancer, heart damage, reproductive problems, neurological disorders, and other serious health conditions. That is why enforcement of the Clean Water Act is so vital to our nation's health and safety because it gives citizens the avenues to challenge polluters and remove their pollutants.

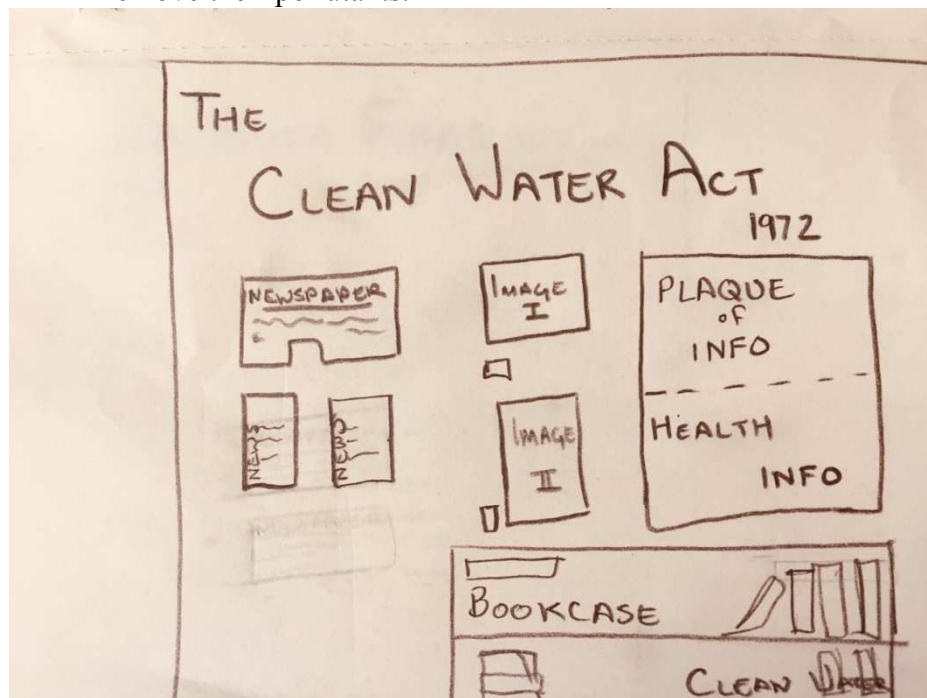
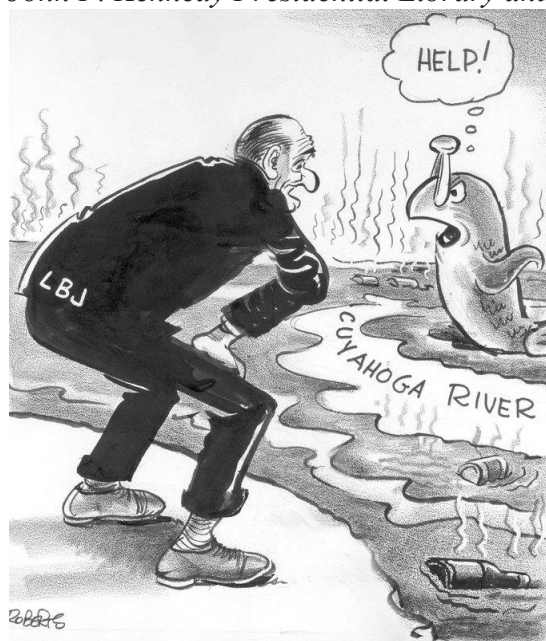


Figure 54: Clean Water Act Wall





**Figure 55: Image I** In this image, President John F. Kennedy is signing an amendment to the Federal Water Pollution Control Act on 20 July 1961.  
*John F. Kennedy Presidential Library and Museum*<sup>47</sup>



**Figure 56: Image II**

This political cartoon from 1969 shows just how serious the pollution had become on the Cuyahoga River. Even the fish had enough of the stink!

*Cleveland State University Library Special Collections*<sup>48</sup>

<sup>47</sup> "BILL SIGNING – HR 6441 PUBLIC LAW 87-88, AMENDMENT TO THE FEDERAL WATER POLLUTION CONTROL ACT, 12:21PM," *John F. Kennedy Presidential Library and Museum*, accessed 21 April 2019, <https://www.jfklibrary.org/asset-viewer/archives/JFKWHP/1961/Month%2007/Day%2020/JFKWHP-1961-07-20-A>.



## Kansas Has Good Start On Pollution Control

The state of Kansas has already gotten a good start in participation in the National Water Pollution Control program authorized by the eightieth Congress.

The report for the state of Kansas was issued by C. W. Anderson, division engineer in the Federal Works Agency's Bureau of Community Facilities.

A network of important watercourses including the Kansas, Big Blue, Missouri, Republican, Verdigris, Solomon, Smoky Hill and Cimarron rivers drain a large part of the state. There are 14 pollution control areas set up by the Public Health Service throughout the country.

Included in the sewage disposal projects in Kansas under the agency's advance planning program for local public works are projects at Alta Vista with an estimated cost of \$57,800 and the plan is now in process, the Junction City project estimated at \$337,300 with the plans in process, and the Leonardville project estimated at \$48,500 with the plans completed.

The planning of these projects had been started before the President signed the Water Pollution Control Act, June 30. This act authorizes the federal government to help the individual states control pollution of their watercourses by providing technical and financial aid.

### Junction City Typical

The FWA advances were intended to provide a reserve of local public works with blueprints and specifications ready to go to contract bidding whenever economic conditions warranted. Throughout the country almost 1,400 sewage disposal projects were included among some 7,000 contemplated local public works which had been put on the drawing boards of architects and engineers.

Kansas, together with other states, is in great need of pollution control in many areas. A typical case is Junction City, where a new sewage treatment plant and intercepting outfall sewer is planned to be built at an estimated cost of \$337,300. The project is endorsed by the Kansas State Board of Health and will be located in the area near the northeastern portion of the city at the junction of Smoky Hill with the Republican river. Fort Riley and Camp Funston are also adjacent to the area and a population increase is a part of the problem.

Before Congress passed the Water Pollution act in June there had been pressure from many sources for many years for such a measure. State health departments of all the states, as well as hundreds of city and county health departments co-operated in obtaining this estimate of the cost of furnishing a health environment for the entire nation. More than half the states have enacted stringent legislation on water pollution control.

### Grant Authority

The Federal Works Administrator is authorized to make grants for preparation of drawings and specifications for sewage treatment works and to make loans bearing two per cent interest for construction of such facilities. Grants for planning and loans for construction cannot be made, however, unless the project is approved by the state water pollution authority and the Public Health Service.

The act also provides for the authorization of up to \$1,000,000 a year for the next five years to the Federal Security Agency to be used as research and investigation grants to state and interstate water pollution control agencies. Another \$1,000,000 a year for five years is authorized to the Federal Works Agency to municipalities to aid them in paying for surveys preliminary to construction of treatment projects approved for loans.

The new law is the first specific federal legislation aimed at cleaning up the streams of the country.

Want ads get results.



**VARSITY  
DRUG**

1224 More Phone 2644

**Figure 58:** This article from *The Manhattan Mercury* of Manhattan, KS discusses the National Water Pollution Control program and what Kansas is doing to meet clean their water. It was published 25 October 1948.<sup>50</sup>

<sup>50</sup> "Kansas Has Good Start on Pollution Control," *The Manhattan Mercury* (Manhattan, KS), 25 October 1948, accessed 31 March 2019, <https://www.newspapers.com/image/423494430/?terms=federal%2Bwater%2Bpollution%2Bcontrol%2Bact>.

## San Fernando Revives Plan for Sewage Plant

Passage of Clean Water Act Gives City Opportunity to Get Construction Funds

BY KENNETH J. FANUCCHI

Times Staff Writer

SAN FERNANDO — Passage of State Proposition 1, the so-called clean water act, may prompt the city to change its plans to purchase \$2 million in additional sewage capacity from Los Angeles.

Robert James, city administrative officer, said his staff is reassessing its sewage plans to determine if it might not be better for the city to construct a water reclamation plant.

The clean water act makes \$250 million in state aid available to cities to build water reclamation facilities, with the state financing up to 80% of the cost.

### Study Possible Benefits

"With this kind of financial assistance, we simply must study the possible benefits of building our own plant," James said.

Several years ago the city considered building a plant but decided to purchase additional capacity from Los Angeles, even though it would have been more expensive initially.

It was estimated that it would cost \$2 million to purchase capacity from Los Angeles and from \$1.6 million to \$1.7 million to construct its own facilities.

The city reasoned that maintenance and operations of its own system would cost more in the long run.

### Negotiations Stalled

Negotiations between San Fernando and Los Angeles started over a year ago on an agreement to purchase additional capacity from the Los Angeles system but have bogged down over water rights between the two cities, James said.

"We cannot agree on eight words in the contract," he said.

The words, as interpreted by San Fernando officials, would cause the city to

relinquish credit for any water reclaimed and thus would indirectly damage San Fernando's claims on area water sources.

The cities have been fighting for years over water rights in the San Fernando and Sylmar basins. San Fernando won rights in the basins in a court suit but Los Angeles is appealing.

### Can't Agree

James said, "We do not feel we can agree to anything that will jeopardize our rights to the water in the area."

Over the next 30 years San Fernando must increase its sewage capacity from 1.1 million gallons to 3 million gallons daily, he said.

Under the Los Angeles plan, Los Angeles simply would enlarge its facilities to handle increased needs of all cities in the area in one system.

With the passage of the clean water act, however, San Fernando is considering going it alone.

## Services Set for Minister

NORTH HOLLYWOOD

—Services for Dr. Gordon Ruud, 50, minister of Christian service at Emmanuel Lutheran Church, will be held today at 10 a.m. at the church, 11919 Oxnard St.

Dr. Ruud died late Thursday at St. Joseph Hospital in Burbank following a heart seizure.

As a minister at Emmanuel since 1968, he initiated a wide variety of community outreach programs.

**Figure 59:** This article in the *Los Angeles Times* from 9 November 1970 discusses the Clean Water Act and what changes it required to be made in California in order to cut down on pollution and increase infrastructure.<sup>51</sup>

<sup>51</sup> Kenneth J. Fanucchi, "San Fernando Revives Plan for Sewage Plant," *Los Angeles Times*, 9 November 1970, accessed 31 March 2019, <https://www.newspapers.com/image/383082786/?terms=clean%2Bwater%2Bact>.



### **Section III: The Invisible**

#### **Subsection I: Climate Change Wall**

The next area will be marked by yet another hanging sign showing its devotion to “The Invisible,” also known as greenhouse gas emissions. It will span two different walls, a left wall and a right wall, as well as having interactive exhibits in the middle. There will be two different pieces of information displayed in this space. First, there will be information spanning the left wall about carbon emissions from vehicles and the research, done by leading scientists, which culminated in the understanding of greenhouse gases in the form of a plaque and various other mediums of sources. It will build upon the information given in the Clean Air section and will feature overviews of the findings of Svante Arrhenius and Guy Stewart Callendar back in 1896 and 1938.<sup>52</sup> It will also feature Arie Haagen-Smit’s findings after the Los Angeles smog events.<sup>53</sup> It will then introduce the Keeling Curve and how it is currently tracking the amount of carbon emissions going into the atmosphere.<sup>54</sup> There will also be smog bricks displayed made by Chinese art-activist Wang Renzheng, also known as Brother Nut.<sup>55</sup> These bricks were actually made by Brother Nut sucking the smog out of the air in Beijing and will be accompanied in the display by the vacuum he used in his endeavor. A plaque and additional images will accompany the artifacts. The plaque for the greenhouse effect section will state:

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<sup>52</sup> Svante Arrhenius, "On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground," *Philosophical Magazine and Journal of Science*, series 5 volume 14 (April 1896): 237-276, accessed 19 March 2019, <https://doi.org/10.1080/14786449608620846>.

<sup>53</sup> Chip Jacobs and William J. Kelly, *Smogtown: The lung-burning history of pollution in Los Angeles* (New York, NY: The Overlook Press, 2008), 69-74.

<sup>54</sup> “The Keeling Curve.” *Scripps Institution of Oceanography*, accessed 19 March 2019. <https://scripps.ucsd.edu/programs/keelingcurve/>.

<sup>55</sup> Aliya Barnwell, “A Chinese artist made a solid brick of pollution by vacuuming smog out of the air,” *Digital Trends*, 9 December 2015, accessed 19 March 2019, <https://www.digitaltrends.com/photography/chinese-artist-brick-of-pollution/>.

As all this pollution came to a head, the public was more invested in understanding both the visible and invisible causes of toxicity in our atmosphere. In order to understand the problems facing them in the present, scientists looked to environmental research of the past. Many recalled the “greenhouse effect” research done by Svante Arrhenius and Guy Stewart Callendar back in 1896 and 1938, respectively, when they discovered that rising levels of Carbon Dioxide ( $\text{CO}_2$ ) released into the atmosphere by burning coal could actually manipulate our environment. The increase of atypical gases in the atmosphere was causing radiation from the sun to become trapped and reflected back into the atmosphere; thus, warming the planet. This phenomenon is then exacerbated by the warmer temperatures resulting in more water vapor evaporation which then doubles the amount of molecules in the atmosphere which can trap and reflect radiation back into the atmosphere.

Applying this theory to their present problem in the late 1940s, scientists such as Arie Haagen-Smit, looked into the elemental makeup of the smog in areas like Los Angeles where it was discovered that the primary contributor was  $\text{CO}_2$  emissions from automobiles. This made sense. Near the end of WWII, there was a significant boom in automobile sales in which their production quadrupled. More cars on the road meant more  $\text{CO}_2$  in the air. As research continued, emerging trends led scientists back to the work of Arrhenius and Callendar to explore a more disturbing idea: What if the increased levels of  $\text{CO}_2$  were also causing the temperature to rise? Shortly thereafter in 1957, scientists like Charles David Keeling analyzed data based on the increase in  $\text{CO}_2$  emissions and discovered that, due to the behavior of the greenhouse effect, the temperature of the earth was increasing at an extraordinary and exponential rate which directly reflected the increase of  $\text{CO}_2$ .

The plaque for the second section with Brother Nut’s work will read:

In 2015, an artist named Brother Nut spent 100 days traveling Beijing with a vacuum trailing behind him. Running the vacuum, his intention was to pull the microscopic particles that form Beijing’s notorious smog out of the air. With the particulates, he formed large bricks to show the government and the public the more concrete version of an abstract noxious cloud. Brother Nut was angered that the Chinese government was not doing anything to protect its people. He hopes that his art inspires others to reflect on the way they use natural resources.

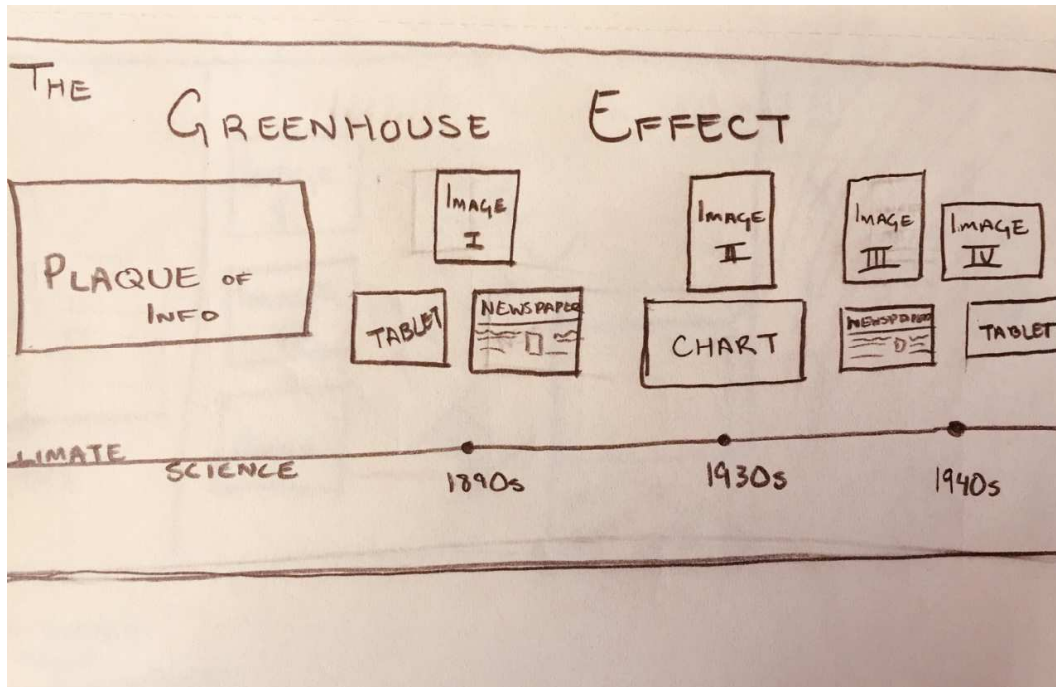


Figure 60: Climate Change Wall

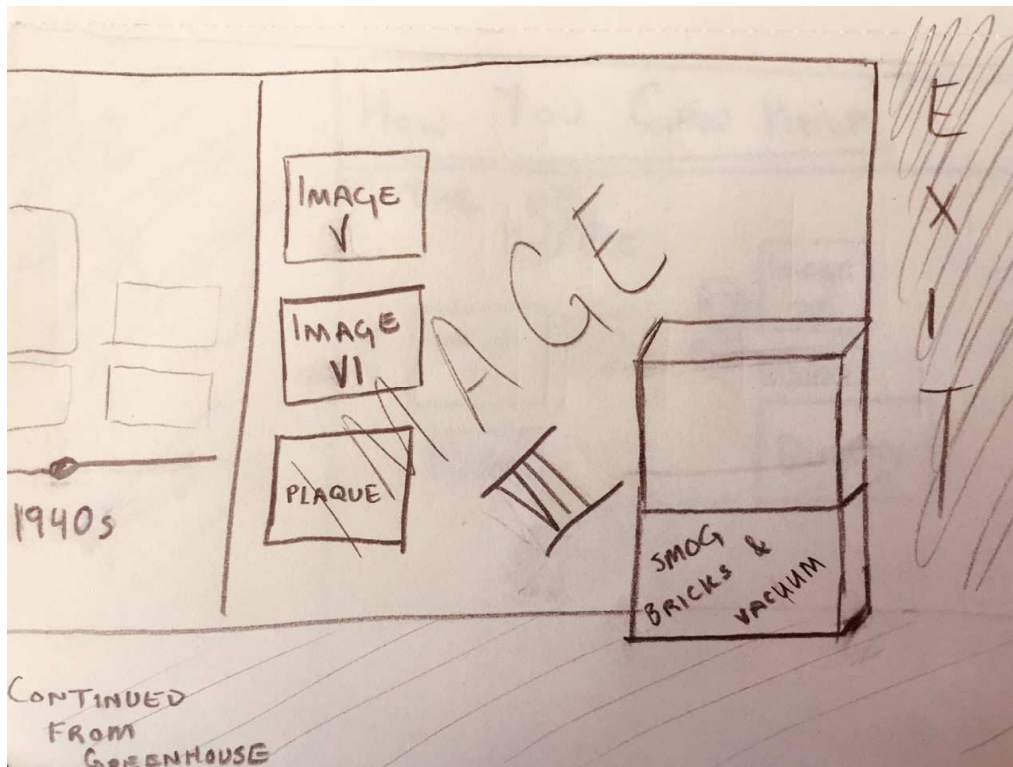
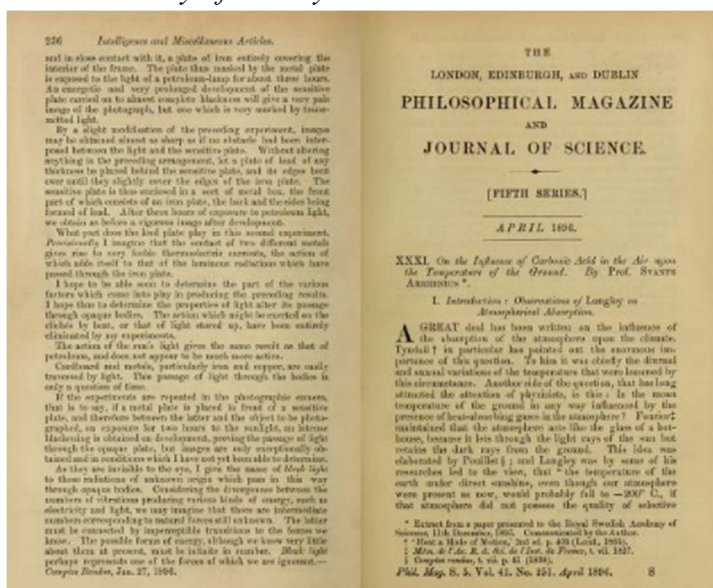


Figure 61: Climate Change Room Continued



**Figure 62:** Image I Photomechanical print of Svante Arrhenius published Adolf Eckstein. *The University of Pennsylvania Libraries*<sup>56</sup>



**Figure 63:** On the tablet, there will be a readable Copy of *On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground* which was written by Svante Arrhenius with link to online access via the *Internet Archive*. There will also be a sign next to this image requesting visitors to take a picture of the link so they can access the article online after they leave. *Internet Archive*<sup>57</sup>

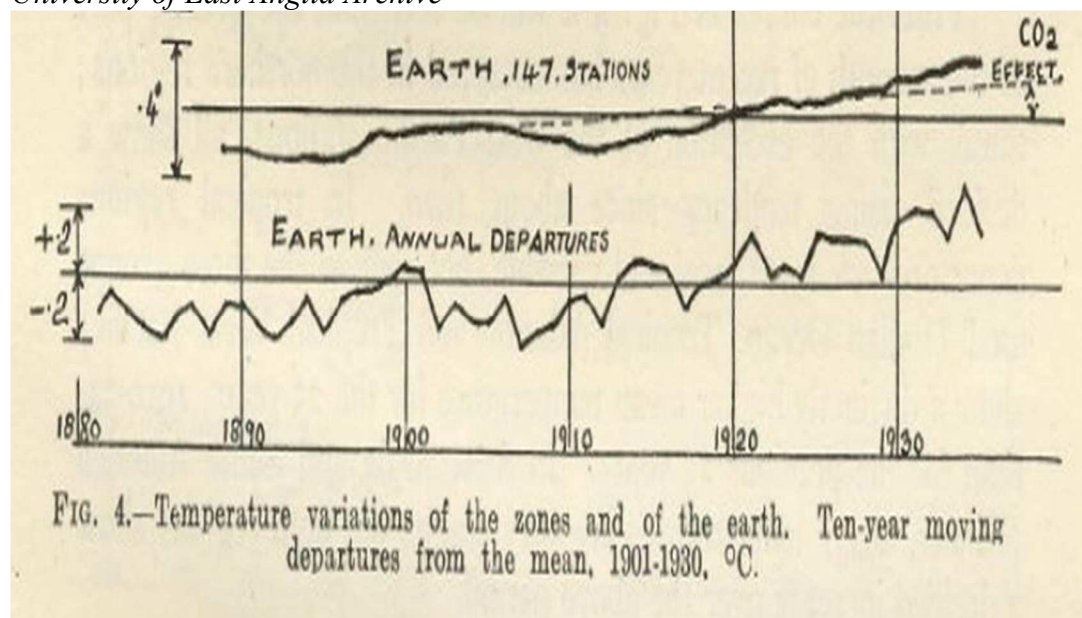
<sup>56</sup> "Svante Arrhenius," *The University of Pennsylvania Libraries: The Edgar Fahs Smith Memorial Collection*, accessed 21 April 2019, <http://sceti.library.upenn.edu/sceti/smith/scientist.cfm?PictureID=661&ScientistID=19>.







**Figure 65: Image II Guy Stewart Callendar Portrait**  
*University of East Anglia Archive*<sup>59</sup>



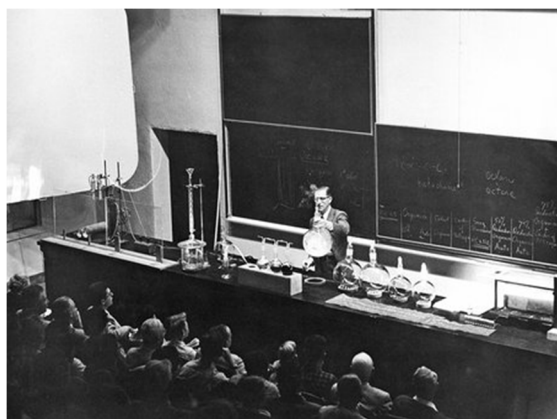
**Figure 66:** Guy Stewart Callendar chart depicting the ‘CO<sub>2</sub> Effect’ where there is a correlation between the more CO<sub>2</sub> in the air, the warmer the temperature.<sup>60</sup>

<sup>59</sup> “Guy Stewart Callendar Archive,” *University of East Anglia Archive*, accessed 21 April 2019, <https://portal.uea.ac.uk/library/archives/callendar>.



**Figure 67: Image III** Arie Haagen-Smit is performing one of many experiments related to the environment at the California Institute of Technology.

*Caltech Archive*<sup>61</sup>



**Figure 68: Image IV:** Professor Arie Haagen-Smit creating a batch of smog while presenting a public lecture at the California Institute of Technology.

*Caltech Archives*<sup>62</sup>

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<sup>60</sup> Michael Graham Richard, "Guy Callendar's groundbreaking scientific paper on man-made global warming is 75 years old," *Treehugger*, 23 April 2013, accessed 21 April 2019, <https://www.treehugger.com/climate-change/guy-callendars-groundbreaking-scientific-paper-man-made-global-warming-75-years-old.html>.

<sup>61</sup> "ARIE HAAGEN-SMIT," *Caltech Archives*, accessed 21 April 2019, <http://archives-dc.library.caltech.edu/islandora/object/ct1%3A3804>.

<sup>62</sup> Douglas Smith, "Fifty Years of Clearing the Skies," *CalTech*, 25 April 2013, accessed 21 April 2019, <https://www.caltech.edu/about/news/fifty-years-clearing-skies-39248>.

## Scientist Says Better Engines Would Reduce Smog

By PAUL F. ELLIS  
United Press Science Writer

PASADENA—America "rolls on wheels" and is rolling into dangerous smog that will get worse if something isn't done, a scientist believes.

Furthermore, according to Arie J. Haagen-Smit, professor of di-organic chemistry at California Institute of Technology, industry should strive to design engines with improved combustion.

Haagen-Smit, in a recent survey taken for the Los Angeles county air pollution district, found that the irritant in the smog here is organic peroxide, a by-product of the oxidation of hydrocarbons—in other words, waste gases from combustion engines such as the automobile and industrial plant motors.

Organic peroxide, he said, long has been known for its poisonous action. In fact, it can be used as an explosive.

"People breathing it naturally are affected," he said. Haagen-Smit, a native of The Netherlands and an expert on flavoring and smells in oils, said filters are not the answer to the smog problem.

## New Suit Filed Seeking Glendale Pastor's Ouster

GLENDALF.—(AP)—A renewed attempt to oust the Reverend J. Whitcomb Brougner, Jr., 46, pastor of the fashionable First Baptist Church of Glendale, was sought today in a second suit charging him with misconduct involving women or his congregation and misuse of church funds.

A similar suit brought by two members of the church against the Reverend Mr. Brougner was dismissed February 11 by Superior Judge William B. McKesson.

The new action was instigated by Edgar Maxwell, a church member, who alleged the suit was authorized

held, and every charge, every accusation and every bit of so-called evidence was heard, and our pastor was completely vindicated," the statement read.

The new complaint, filed by Attorney A. Brigham Rose, charged that "it was ascertained" the Reverend Mr. Brougner was using the church fellowship fund "for the purpose of quieting complaints of complaining husbands in regard to his improper conduct with the wives of such members; that he was using the funds to get witnesses who were prepared to testify against him, to leave the jurisdiction of California."

Louis G. McCabe, director of the Los Angeles air pollution district, said surveys should be made in other areas where smog is reported.

"The problem is becoming worse," he said.

He recalled that of the first 10 cities in the country, Los Angeles has had the most rapid growth in industry. In 1930, the county had about 1500 industrial plants. Today, it has about 6000. In a seven-year period, he said, industrial employment has increased by 99 per cent. In the other industrial areas, employment increase has averaged between 10 to 40 per cent.

Smog conditions are made more critical when low-lying fogs settle and, through temperature inversions, are prevented from blowing away. In such cases, the concentration of impurities becomes greater—thus causing serious consequences. At Donora, Pa., last fall, 19 persons, most of them elderly, died as a result of a five-day fog trapped in the Monocahela valley when prevailing winds changed their direction. Air pollution experts on the west coast believe there will be other Donora tragedies unless something is done to clear up the air.

## Ferreri Death Trial Moves

Figure 69: Article written in the *Bakersfield Californian* on 11 March 1949 about Arie Haagen-Smit and his ideas on pollution.<sup>63</sup>

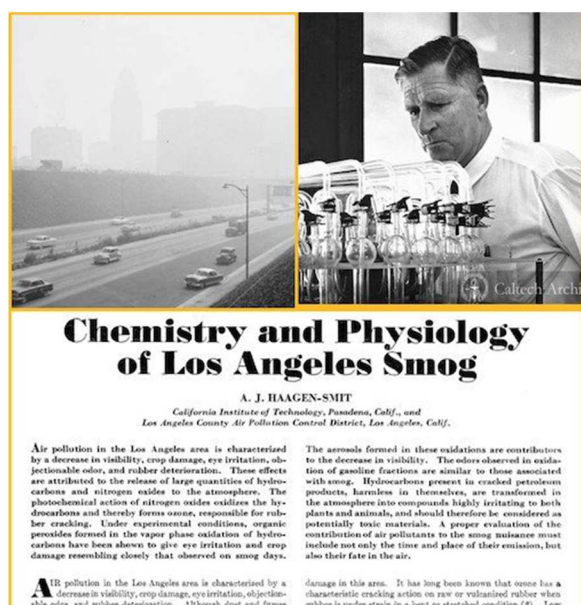


Figure 70: On the tablet, there will be a readable Copy of Chemistry and Physiology of Los Angeles Smog with link to online access via Caltech. There will also be a sign next to this image requesting visitors to take a picture of the link so they can access the article online after they leave.<sup>64</sup>

<sup>63</sup> Paul F. Ellis, "Scientist Says Better Engines Would Reduce Smog," *Bakersfield Californian*, (Bakersfield, CA), 11 March 1949, accessed 28 March 2019, <https://www.newspapers.com/image/3288162/?terms=Arie%2BHaagen-Smit>.

<sup>64</sup> A. J. Haagen-Smit, "Chemistry and Physiology of Los Angeles Smog," *Industrial and Engineering Chemistry* 44, no. 6 (1952), 1342-1346, accessed 21 April 2019, <https://doi.org/10.1021/ie50510a045>.





**Figure 71: Image V**

Face masks were added to statues at Peking University in order to protest the ongoing Beijing smog.

*Sina Weibo*<sup>65</sup>



**Figure 72: Image VI**

Beijing shrouded in smog

*China Foto Press/Getty*<sup>66</sup>

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<sup>65</sup> Bing, "Face Masks on Peking University Statues Protest Beijing Smog," *chinaSmack*, 5 March 2014, accessed 21 April 2019, <https://www.chinasmack.com/face-masks-on-pekking-university-statues-protest-beijing-smog>.

<sup>66</sup> Trevor Nace, "Beijing Declares 'Red Alert' Over Pollution: Haze Visible From Space," *Forbes*, 9 December 2015, accessed 21 April 2019, <https://www.forbes.com/sites/trevornace/2015/12/09/beijing-declares-red-alert-pollution-haze-visible-space/#4e72e9ed60b7>.



**Figure 73: Image VII**

Brother Nut using his vacuum to collect the smog near the Beijing National Stadium on 15 November 2015.

*Dong Dalu*<sup>67</sup>

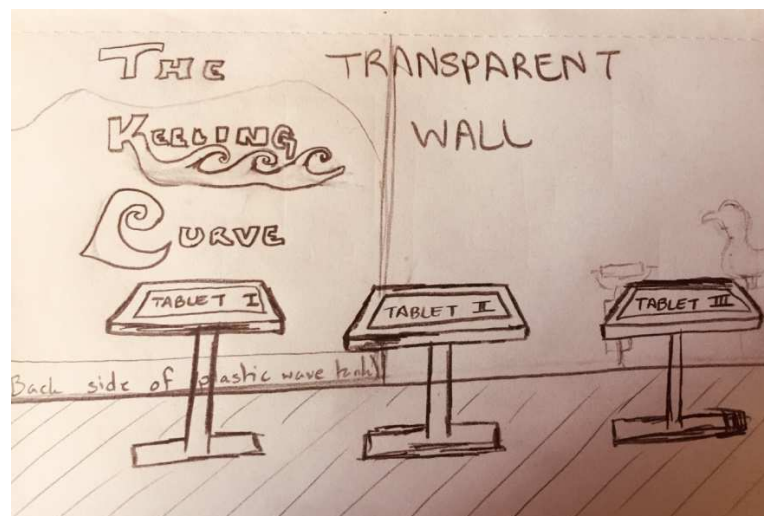
## **Subsection II: Transparent Wall Space**

In the middle of this space will be three touch screen tablets set up on stands. These will serve as interactive devices for the Keeling Curve and the data from *Scripps Institution of Oceanography*. Visitors can flip through graph after graph to see how dramatic the shift has been in greenhouse gas emissions over time. This area will also have a recycled transparent plastic wall separating the left half from the right half of the space. On the other side of the recycled transparent plastic wall will be an albatross display and an ocean pollution display. The albatross will be made out of recycled materials. Next to the albatross will be a spinnable tube borrowed

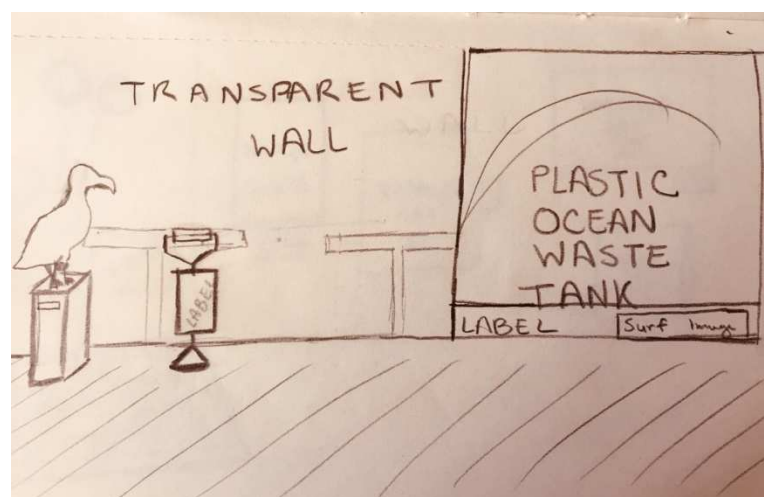
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<sup>67</sup> Chris Buckley and Adam Wu, “Amid Smog Wave, an Artist Molds a Potent Symbol of Beijing’s Pollution,” *The New York Times*, 1 December 2015, accessed 21 April 2019, <https://www.nytimes.com/2015/12/02/world/asia/beijing-smog-air-pollution-artist-brick.html>.

from the Monterey Bay Aquarium which contains plastics pulled from an albatross' stomach.<sup>68</sup> Both will have plaques explaining them. Near it will be a large aquarium (around 7 feet tall) filled with a floating trash island. It will attempt to mimic the waves of the ocean and will include ocean noises. The label affixed to the aquarium will show a surfer and the polluted ocean and shall explain the dangers of pollution.

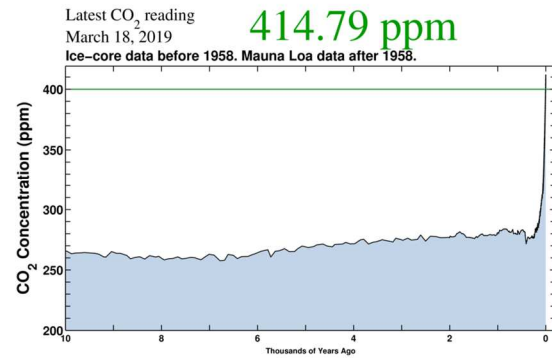
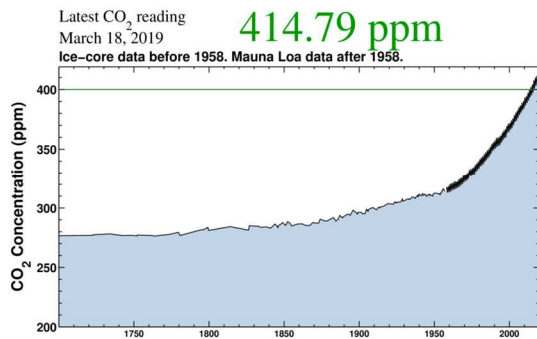
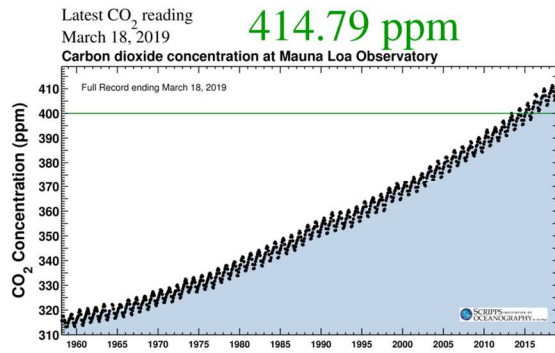
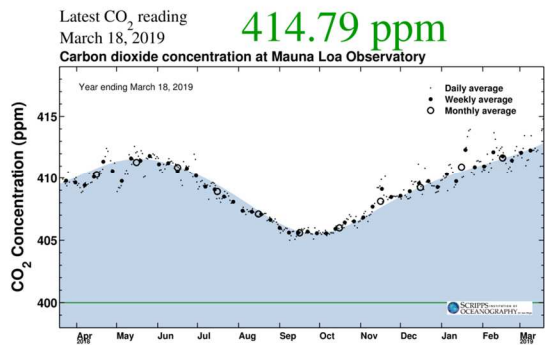
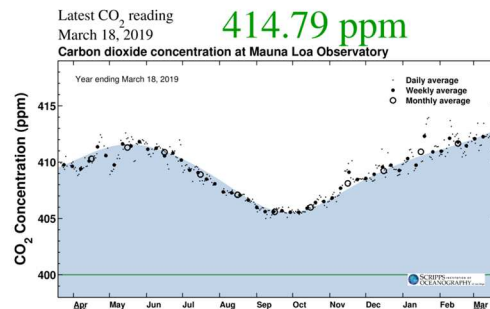
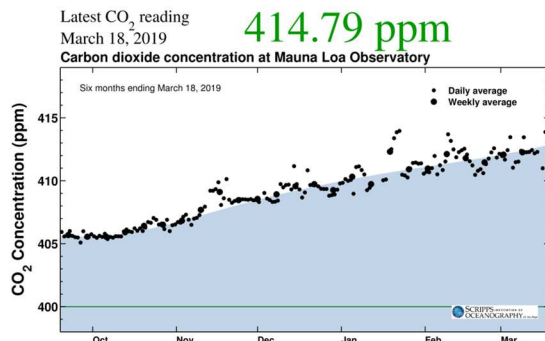
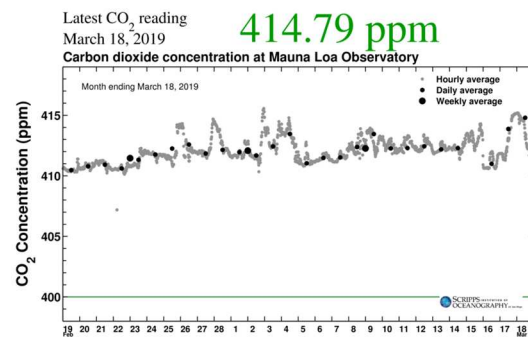
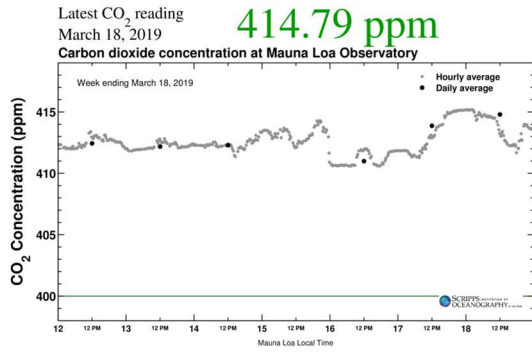


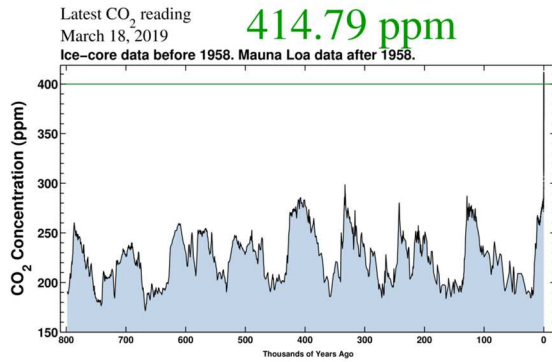
**Figure 74: Keeling Curve Wall**



**Figure 75: Albatross and Ocean Trash Wall**

<sup>68</sup> "Ocean Plastic Pollution," *Monterey Bay Aquarium*, accessed 19 March 2019, <https://www.montereybayaquarium.org/conservation-and-science/our-priorities/ocean-plastic-pollution>.





**Figure 76: Interactive Keeling Curve data from Scripps Institution of Oceanography**

Keeling Curve comes from data recorded at the SCRIPPS Institution of Oceanography at their Mauna Loa Observatory in Hawaii. It is named after scientist Charles David Keeling who began recording data of CO<sub>2</sub> emissions in the atmosphere starting in 1958. Flipping through this data, you can see that the increase in parts per million of CO<sub>2</sub> in the atmosphere directly correlates to the amount of cars on the road post-WWII.

*SCRIPPS Institution of Oceanography*<sup>69</sup>



**Figure 77: Image I** (Rendering of recycled albatross will look like this)

Recycled Albatross

*Angela Haseltine Pozzi and Associates*

<sup>69</sup> “The Keeling Curve,” *SCRIPPS Institute of Oceanography*, accessed 20 April 2019, <https://scripps.ucsd.edu/programs/keelingcurve/>.





**Figure 78: Albatross Stomach Tube**

The Laysan Albatross is a seabird that lives in the North Pacific. Each year, albatross chicks die because they have consumed too much plastic. Studies have shown that 97.5 percent of albatross chicks had plastic in their stomach. The adult birds fly for hundreds, if not thousands, of miles to find jellyfish and fish eggs which typically float on the surface of the water. The trouble is, birds are unable to distinguish plastics from food they are looking for. Because the plastics go undigested, the animals starve to death because they cannot eat or process real foods because their stomachs are filled with trash. This trash is from the stomach of an albatross.

*On loan from Monterey Bay Aquarium*<sup>70</sup>

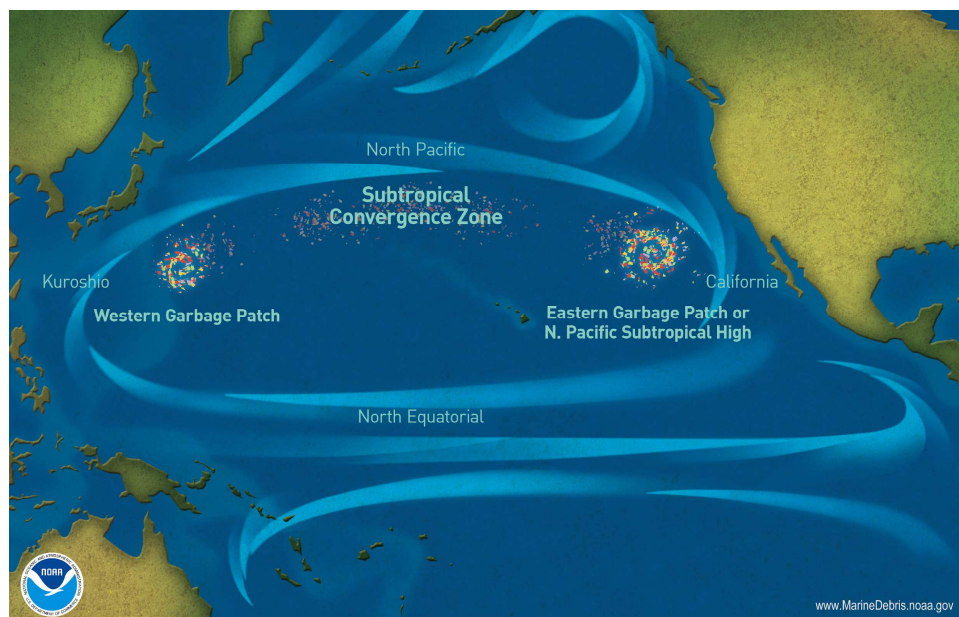


**Figure 79: Image II**

“Wave of Change,” Trash Waves Indonesia

*Zak Noyle*<sup>71</sup>

<sup>70</sup> “Ocean Plastic Pollution,” *Monterey Bay Aquarium*, accessed 20 April 2019, <https://www.montereybayaquarium.org/conservation-and-science/our-priorities/ocean-plastic-pollution>.



**Figure 80: Image III Marine Debris Map**

There are multiple trash convergences currently floating around the Earth's oceans. At least two are in the Pacific Ocean, two in the Atlantic Ocean, and one in the Indian Ocean. Akin to an iceberg, these areas of trash are far more substantial than is visible on the surface. Below the surface, there is trash reaching all the way to the ocean floor. Some of these pieces are microplastics, or almost unnoticeable pieces of plastic that are smaller than 5mm, making them easy to swallow for ocean animals. This is a visual representation of what those convergences are like and how serious the ocean pollution is.

*Trash inside this tank has been pulled from the ocean. Image courtesy of the National Oceanic and Atmospheric Administration.<sup>72</sup>*

### Subsection III: Animals and Climate Art

The right wall of the exhibit will be devoted to images of different climate change issues. It will be set up more like an art exhibit with the images and accompanying labels. However, each label will ask a distinctive and challenging question about the image the audience is viewing. These are the invisible faces of our deteriorating climate who are suffering due to pollution and human encroachment. Images of animals suffering, landscapes changing, and other

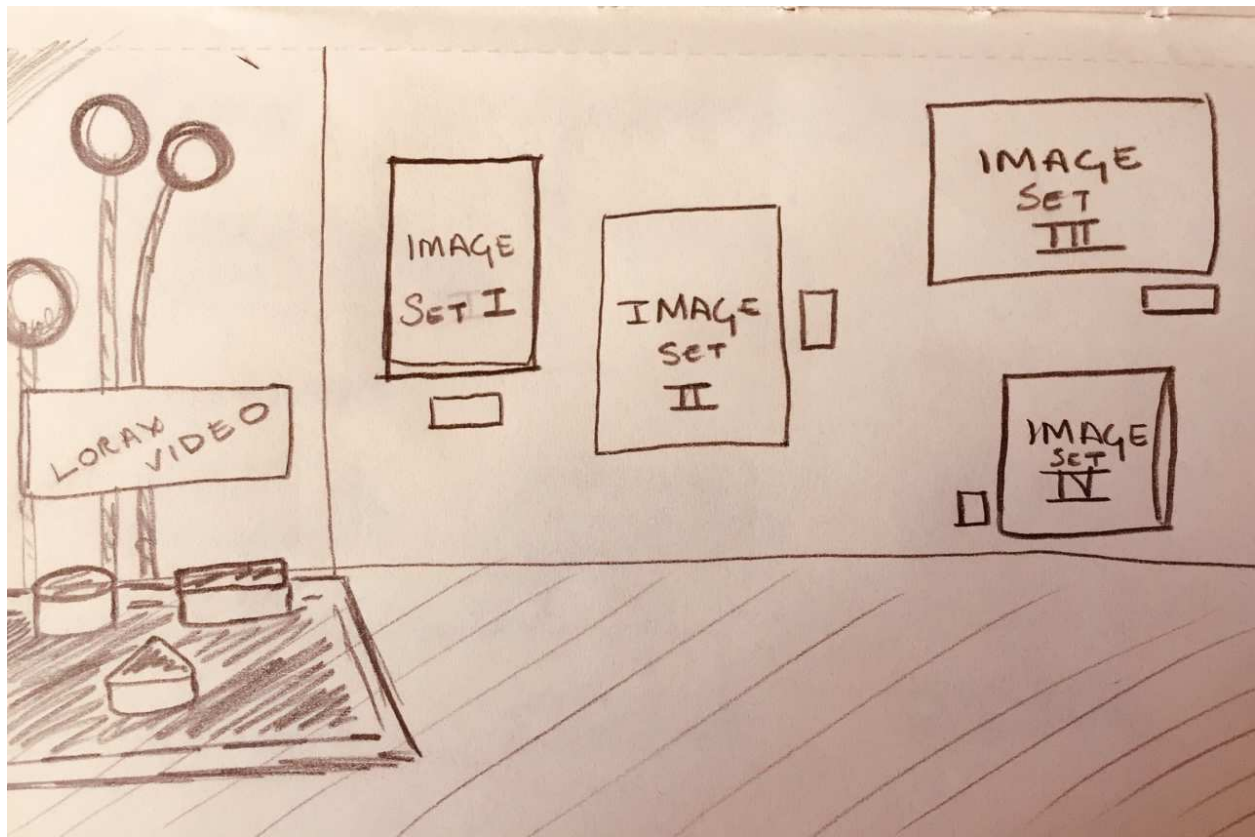
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<sup>71</sup> "Wave of Change," Zak Noyle Photography, accessed 20 April 2019, <https://www.zaknoyle.com/products/wave-of-change-matted-print>.

<sup>72</sup> "Marine Debris," National Oceanic and Atmospheric Administration, accessed 20 April 2019, [https://marinedebris.noaa.gov/sites/default/files/GPmap\\_2012\\_NOAAMDP.jpg](https://marinedebris.noaa.gov/sites/default/files/GPmap_2012_NOAAMDP.jpg).

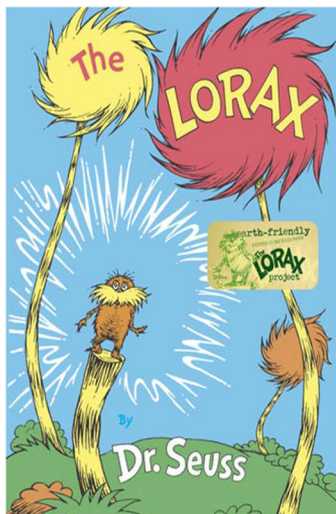
such provocative sights will compel the audience to see what happens when we consume without consideration of the costs. For younger children to connect, this section will also contain a seated area where the book *The Lorax* is read aloud to them via video. There will be a comfortable carpet, paintings of truffula trees on the wall, and various little seating shapes for them to sit upon near the corner. The space is depicted below with the images that will be included. The main plaque briefly states:

The following are images of animals, nature, and the impact humans have had on their existence. This is a reflective space. Contemplate the questions accompanying each image.



**Figure 81: Animal and Climate Art Wall**





**Figure 82: The Lorax<sup>73</sup>**



**Figure 83: Image I**

Koalas were left without a home in Australia after logging entirely stripped their habitat. This one had an ulcerated eye and was treated and then released to a new environment. How would you feel if you lost your home, were injured, and then displaced from your family?

*WIRES Wildlife Rescue<sup>74</sup>*

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<sup>73</sup> Dr. Seuss, *The Lorax* (New York: Random House, 2013).



**Figure 84: Image II**

In South Georgia Island, a fishing net was wrapped around neck of Antarctic Fur Seal. This is a common occurrence for marine life and causes very serious injuries and the net gets wrapped around tighter and tighter until it cuts into the skin of animals. Imagine how torturous it must feel to have the net cut into you day after day because you are unable to remove it yourself.

*Alamy*<sup>75</sup>

<sup>74</sup> “Koala rescued from deforestation in Australia - big picture,” *The Guardian*, 1 May 2013, accessed 20 April 2019, <https://www.theguardian.com/environment/picture/2013/may/01/koala-rescued-deforestation-australia-big-picture>.

<sup>75</sup> “South Georgia Island Leith Harbour Fishing net wrapped around neck of Antarctic Fur Seal *Arctocephalus gazelle*,” *Alamy*, accessed 20 April 2019, <https://bit.ly/2vb3RAk>.





**Figure 85: Image III**

50 tons of dead fish were removed from the waters of Rio de Janeiro prior to the 2016 Olympic Games. The water is unregulated and regularly has sulfur and other contaminants dumped into it. Many scientists attributed the massive die-off to pollution. How painful it must have been to be poisoned to death.

*Leo Correa*<sup>76</sup>



**Figure 86: Image IV**

This is Mae West. She is a common snapping turtle who was found by a little boy with a milk jug ring around her body. Fortunately, her body was able to adapt and grow around the ring, though it seriously deformed her. She was rescued and treated and now lives at the STAR Eco Station in California. How could such an unfortunate event have been prevented?

*5 Gyres*.<sup>77</sup>

<sup>76</sup> “Brazil removes 50 tons of dead fish from Olympic waters,” *Aljazeera America*, 21 April 2015, accessed 20 April 2019, <http://america.aljazeera.com/articles/2015/4/21/brazil-removes-50-tons-of-dead-fish-from-olympic-waters.html>.

*Leo Correa: Photojournalist*, accessed 20 April 2019, <http://leocorrea.net/all-works/>.



**Figure 87: Image V**

“Defenders of Innocence,”

This motherless black rhino calf was found lost and dehydrated. It was sent to Malilangwe Reserve where it will live until it is an adult and released back to the wild. The baby is mouthing the hand of an armed anti-poacher who is there to protect the species from illegal hunting. Poaching for their horns has almost caused black rhinos to go extinct. How does this image make you feel?

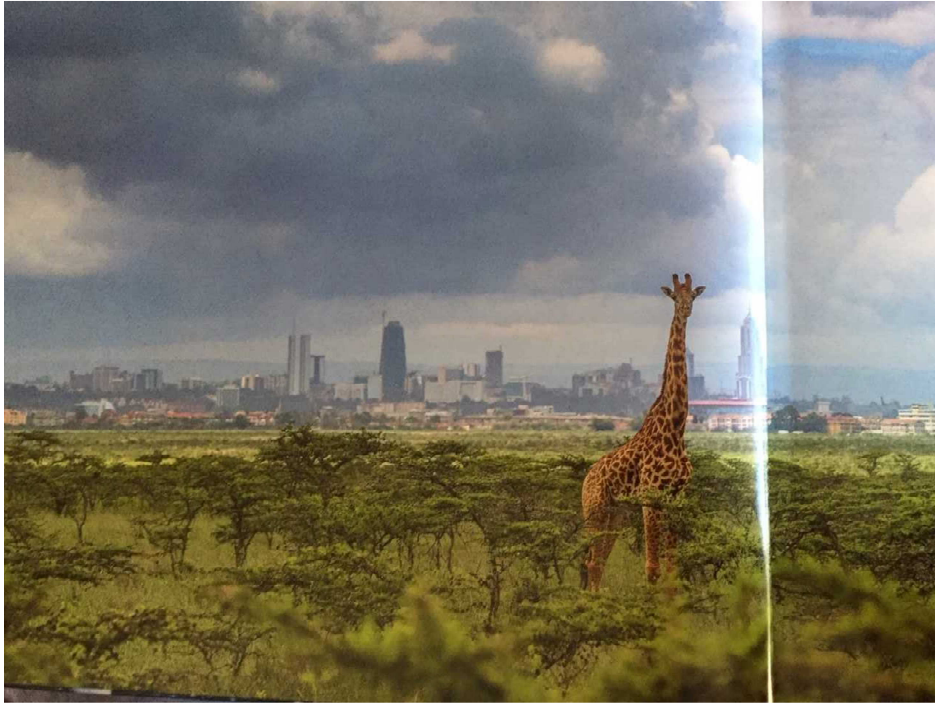
*Hilary O’Leary*<sup>78</sup>

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<sup>77</sup> “Meet Mae West,” *Facebook: STAR Eco Station*, 7 July 2015, accessed 20 April 2019, <https://www.facebook.com/STAREcoStation/posts/meet-mae-west-a-common-snapping-turtle-who-made-the-news-20-years-ago-when-a-you/10153503610929759/>.

5 Gyres: *Science to Solutions*, accessed 20 April 2019, <https://www.5gyres.org/>.

<sup>78</sup> Hilary O’Leary, “Defenders of Innocence,” in *Wonders: Spectacular Moments in Nature Photography*, (San Francisco, CA: Chronicle Books, 2018), 136-137.



**Figure 88: Image VI**

“Nairobi’s Skyscrapers,”

Paras Chandaria read about plans to build a railway through the Nairobi National Park, and rushed out to take this picture. While humans and nature can coexist, the encroachment onto the habitat of native species is taking its toll. More and more animals are struggling to find food, water, shelter, and keep a safe distance from humans. How can we help the wildlife stay wild?

*Paras Chandaria*<sup>79</sup>

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<sup>79</sup> Paras Chandaria, “Nairobi’s Skyscrapers,” in *Wonders: Spectacular Moments in Nature Photography* (San Francisco, CA: Chronicle Books, 2018), 2-3, 144.





**Figure 89: Image VII**

This Guillemot was found covered in sludge after the Empress Oil spill in West Wales. Birds are very susceptible to oil spills due to their hollow bones which leaves them unable to fly or even move. Slick and heavy oil can compromise their natural buoyancy and pull them deep into the water where they drown. The poor birds who attempt to clean themselves end up poisoning their organs, and the gumming of their feathers prevents them from retaining body heat so they often succumb to hypothermia. How can humans do more to prevent oil spills?<sup>80</sup>

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<sup>80</sup> "Oiled Guillemot after Empress oil spill, West Wales," *Getty*, accessed 20 April 2019, <https://www.gettyimages.com/detail/photo/oiled-guillemot-after-empress-oil-spill-west-wales-royalty-free-image/dv118021>.





**Figure 90: Image VIII**

Although goats are often considered an animal that will eat anything, this is a misconception. Goats are very adept at survival and can root through human made garbage for the most nutritious portions. However, they are still susceptible to the same dangers of eating man-made waste as other animals. Akin to the albatross, studies have shown there are increasing numbers of goats consuming plastics. The trouble with plastic is that it does not break down and comes to fill the stomach over time. Hence, it is essential that humans do more to get rid of plastics. What can you do to help cut down on the amount of plastics in the environment? <sup>81</sup>

#### **Section IV: The Choices**

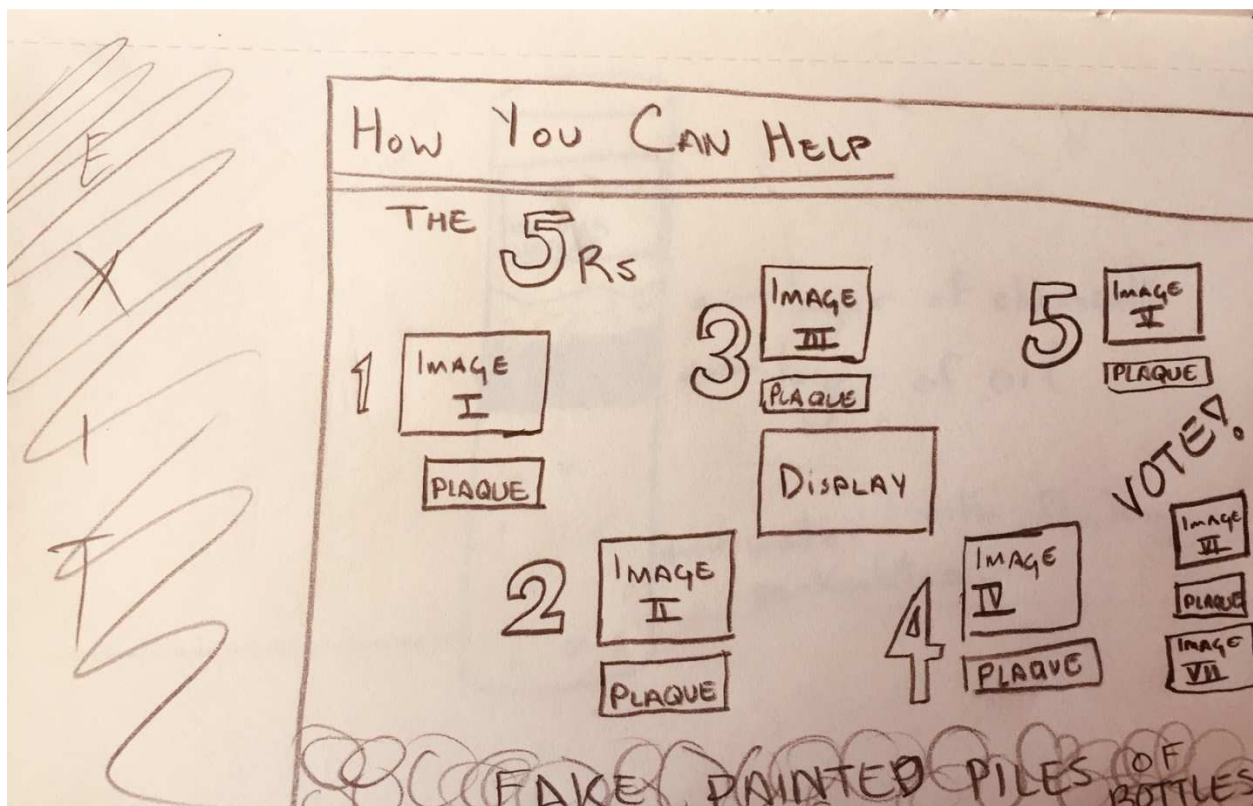
This is the last wall of the exhibit. Above it will hang another sign stating, “The Choices.” On this wall there will be different ideas for how the public can go about protecting the environment. It will go into the 5 Rs of conservation: Refuse, Reduce, Reuse, Repurpose, and Recycle. Each one will have an accompanying explanation that shows what everyday choices

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<sup>81</sup> “Animals eating washed up garbage in water,” *Getty*, accessed 20 April 2019, <https://www.gettyimages.com/detail/photo/animals-eating-washed-up-garbage-in-water-royalty-free-image/510586395>.

can be made in order to improve the health of our planet. Some will be physical examples or refusing things such as plastic straws and replacing it with a reusable straw. This conservation wall will also talk about ways to decrease the amount of automobile pollution by using different forms of transportation, carpooling, and alternative energy. There will also be information about voting in order to ensure that vital policies like the Clean Air and Clean Water Acts are protected without rollbacks. A rendering of this space and the sources included in the area are below.

Below, painted on the wall will be piles of realistic looking plastic bottles.



**Figure 91: The Choices Wall**



**Figure 92: Image I**

### **Refuse**

This man is holding drinking straw from plastic pollution collected on beach, North East England, UK. Next time you are at a restaurant, drive-thru, or other establishment, refuse to get a straw with your drink. According to a study done at the University of California, Santa Cruz, 91 percent of the plastics we use are never recycled. An easy way to cut back on this wasteful consumption is to be mindful of unnecessary plastics in your life, such as drinking straws.

*Getty*<sup>82</sup>

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<sup>82</sup> “Man holding drinking straw from plastic pollution collected on beach, North East England, UK,” *Getty*, accessed 20 April 2019, <https://www.gettyimages.com/detail/photo/man-holding-drinking-straw-from-plastic-pollution-royalty-free-image/998268474>.



**Figure 93: Image II**

**Reduce** It is easy to do more to reduce your carbon footprint. Instead of driving everywhere, try biking or walking on pleasant days. Utilizing public transportation also cuts emissions because many people can fit into underground metros and that prevents all of those individuals driving separate cars. Another way to reduce the amount of waste generated by the world is to contemplate impulse purchases and invest in memories over ‘stuff.’

*Getty*<sup>83</sup>

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<sup>83</sup> “Smiling young businessman commuting, riding bicycle on sunny urban street,” *Getty*, accessed 20 April 2019, <https://www.gettyimages.com/detail/photo/smiling-young-businessman-commuting-riding-bicycle-royalty-free-image/906503668>.





**Figure 94: Image III**

**Reuse** Disposable items can easily be replaced with reusable items. Every second in the United States, over 1,500 plastic bottles are used and discarded. Imagine how much cleaner the environment would be if we opted for reusable water bottles instead!

*Getty*<sup>84</sup>

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<sup>84</sup> “Still life of plastic bottles, source of pollution,” *Getty*, accessed 20 April 2019, <https://www.gettyimages.com/detail/photo/still-life-of-plastic-bottles-source-of-pollution-royalty-free-image/998263814>.



**Figure 95: Image IV**

**Repurpose** Instead of letting older items go to waste, how about using them to create something new! Many different items can be repurposed into creative artistic pieces such as this Christmas tree! Pickle jars can become eclectic drinkware. The damage caused by a strong storm can turn downed tree limbs into an unforgettable accent wall inside the house.

*Getty*<sup>85</sup>

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<sup>85</sup> “Green/Sustainable Living: Christmas tree made of recycled plastic bottles,” *Getty*, accessed 20 April 2019, <https://www.gettyimages.com/detail/photo/green-sustainable-living-royalty-free-image/725735507>.





**Figure 96: Image V**

**Recycle** Most items that are regularly used can be recycled somewhere. Plastics, paper, cardboard, glass, and aluminum are some that most city recycling companies will collect. However, electronic goods, batteries, light bulbs, and even cars can be sent to specialized facilities for recycling. When you get home, look up your local facilities and join the recycling movement. The planet will thank you!

*Getty*<sup>86</sup>

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<sup>86</sup> Close up hand throwing empty plastic bottle into the trash,” *Getty*, accessed 20 April 2019, <https://www.gettyimages.com/detail/photo/close-up-hand-throwing-empty-plastic-bottle-into-royalty-free-image/951392496>.



**Figure 97: Reusable Straws for Display<sup>87</sup>**



**Figure 98: Reusable Water Bottle for Display<sup>88</sup>**

<sup>87</sup> “Stainless Steel Straw Set with cleaning brush (4 Pack) Eco Friendly Reusable Drinking Straws,” *Green Steel*, accessed 20 April 2019, <https://greenssteel.com/collections/accessories/products/stainless-steel-straws>.



**Figure 99: Image VI Voting**

Beyond the 5 Rs, there is one more essential component of conservation which is the easiest for any citizen to undertake: voting. Here, in the home and heart of American democracy, countless pieces of legislation go in and out of committees which could have significant impacts on our personal health and the health of the environment. By casting your ballot and advocating for your beliefs, you can make sure that our nation does more to improve the quality of life for all so that generation beyond ours can partake in the pursuit of happiness!

*Getty*<sup>89</sup>

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<sup>88</sup> “32 oz Wide Mouth,” *Hydro Flask*, accessed 20 April 2019, <https://www.hydroflask.com/32-oz-wide-bottle/color,lemon,a,92,o,66>.

<sup>89</sup> “Senior Mexican Woman Voting: A beautiful senior Mexican woman at the voting booth,” *Getty*, accessed 20 April 2019, <https://www.gettyimages.com/detail/photo/senior-mexican-woman-voting-royalty-free-image/1026684718>.



**Figure 100: Image VII Voting**  
U.S. Capitol during the Bicentennial of the Constitution Celebration  
*Getty*<sup>90</sup>



**Figure 101: Reusable Bag for Display**<sup>91</sup>

<sup>90</sup> “This is the U.S. Capitol during the Bicentennial of the Constitution Celebration. There are red, white and blue balloons falling around the Capitol Dome. It marks the dates that commemorate the Centennial 1787-1987,” *Getty*, accessed 20 April 2019, <https://www.gettyimages.com/detail/photo/this-is-the-u-s-capitol-during-the-bicentennial-of-royalty-free-image/73070864>.

<sup>91</sup> “Canvas Tote Bags: Museum of Natural History Tote Bag,” *Café Press*, accessed 20 April 2019, [https://www.cafepress.com/+museum\\_of\\_natural\\_history\\_tote\\_bag\\_393272984](https://www.cafepress.com/+museum_of_natural_history_tote_bag_393272984).

## **Section V: The Online Exhibit**

The online counterpart of this exhibit will utilize the programs of the National Museum of Natural History to map the exhibit space and put it on the website. No renderings of the online exhibit are shown in this proposal because the online space will literally be the interactive images of the physical space. The Virtual Tours offered by the NMNH use 360 degree capturing of the space to depict the museum environment in a manner that puts the audience in charge. Instead of being a point and click experience, visitors have full control of their view, just as they do in daily life. They can glide left, right, up, down, zoom in, and zoom out in a natural way. Their view is fluid, meaning turning left shows the space to the left as if turning one's head, without loading or being redirected to another page. This exhibit will utilize the imaging and coding of Loren Ybarrondo as was done for the current virtual tours presented on the site.<sup>92</sup>

The special exhibits space where *Contemplating Climate Change* will be presented is depicted virtually at the website with their mapping of the past exhibit *Genome* and can be explored for further reference.<sup>93</sup>

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<sup>92</sup> "Virtual Exhibit: Ice Age I," *National Museum of Natural History*, accessed 27 April 2019, <https://naturalhistory2.si.edu/vt3/list-3-past.html>.

<sup>93</sup> "Genome I," *National Museum of Natural History*, accessed 27 April 2019, [https://naturalhistory2.si.edu/vt3/NMNH-DNA/z\\_NMNH-DNA-001.html](https://naturalhistory2.si.edu/vt3/NMNH-DNA/z_NMNH-DNA-001.html).

### Chapter 3: Specialized Audience

The target audience for this exhibit can be separated into three different categories. First, there are those who already believe that climate change is real. Second, there are those who are on the fence about the idea. Third, and most challenging, there are those who are opposed to climate change. Due to the content of the exhibit, projected attendance for the exhibit shows a larger number of people who already agree to the reality of climate change attending over those who are unsure and deniers. Still, a dual purpose of this exhibit would be to change the minds of those unexpected guest and also educate believers on how to open historically informed dialogues with people in their lives who are on the fence or are climate deniers.

In order to accomplish any public history institution goal, international museum consultants Timothy Ambrose and Crispin Paine say it is vital to understand the audiences to which you are attempting to appeal.<sup>1</sup> Thus, research has been conducted into the various different groups and what motivating factors drive their attendance. Recent study into social and environmental psychology has discovered certain broad personality characteristics that would identify pro-environment behavior in various domains.<sup>2</sup> Boyka Bratanova, Steve Loughnan, and Birgitta Gatersleben found that there is a “moral circle” which motivates people to positive environmental leanings and activism. This moral circle encompasses, “entities considered worthy

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<sup>1</sup> Timothy Ambrose and Crispin Paine, *Museum Basics*, 3rd ed. (New York: Routledge, 2012, c1993).

Ross Parry ed., *Museums in a Digital Age* (New York: Routledge, 2010), 31-41.

<sup>2</sup> Boyka Bratanova, Steve Loughnan, and Birgitta Gatersleben, “The Moral Circle as a Common Motivational Cause of Cross-Situational pro-Environmentalism.” *European Journal of Social Psychology* 42, no. 5 (2012): 539-545, <https://doi.org/10.1002/ejsp.1871>.



of moral regard and treatment.”<sup>3</sup> Thus, the number of natural entities a person is concerned for directly correlates to their willingness to protect the environment. If a person is concerned with animal welfare, bird-watching, or values hiking in national parks, they are going to be more inclined to support pro-environment stances. This information is valuable because it gives concrete direction to the content of the exhibit. The likelihood that the exhibit will be well-received increases by including images which appeal to the moral motivation of environmental supporters.

Furthermore, this research also illuminates a way to develop an emotional appeal to audience members who are on the fence. In order to ease them into the most receptive state possible, the exhibit must appeal to issues within most people’s moral circle that they do not realize are affected by environmental degradation. For example, most people regard children as part of their moral circle. While children are not directly part of nature, they are indirectly affected by the various toxicity events that have occurred. Giving a human face to these ‘invisible’ pollutants will create a visceral connection to the topic and inspire these visitors to interact with the historical information more intently. A second study done by Dr. P. Wesley Schultz expands upon the idea of people responding to nature in as much as they relate to nature.<sup>4</sup> He contends that this environmental concern manifests in three different ways: egoistically, altruistically, and biospherically. Egoistic environmentalists will only protect the parts of the environment that serve them. Altruistic environmentalists will protect the

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<sup>3</sup> Bratanova, Loughnan, and Gatersleben, “The Moral Circle,” 539.

<sup>4</sup> P. Wesley Schultz, “Empathizing With Nature: The Effects of Perspective Taking on Concern for Environmental Issues,” *Journal of Social Issues* 56, no. 3 (2000): 391–406, <http://dx.doi.org/10.1111/0022-4537.00174>.

environment when it is for the greater good of individuals closest to them, their community, or humanity as a whole. Biospheric environmentalists will be driven to protect the environment because of a value for all living entities. Most individuals on the fence will fall into the egoistic and altruistic categories. In order to reach them, this exhibit will employ similar methods to the study conducted by Schultz.

After identifying where amongst the triad participants belonged, Schultz conducted a second study where he exposed subjects to various images of the environment.<sup>5</sup> One of these images was of an animal being harmed by environmental pollution. The subjects were then asked to put themselves in the place of the animal and imagine how this would feel. Subjects then had to score how they felt about the environment in a survey. The study showed that exposure to this image accompanying a request to empathize with the animal significantly increased the biospheric response to climate issues. In this exhibit, there will be a few images of animals and the effects of pollution included which will be accompanied by phrases asking the audience to imagine what this feels like. Using the study as an indicator, this should increase interaction with and reception of the thesis.

While the biospheric exposure method should increase responsiveness in some climate deniers, further studies have discovered that the dilemma of reaching the third branch of the audience is more complex than moral motivation. Katharine Hayhoe is a climate scientist and has recently been researching climate denial.<sup>6</sup> She discovered that instead of seeing climate

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<sup>5</sup> Schultz, "Empathizing With Nature," 397-404.

<sup>6</sup> Katharine Hayhoe, "The Most Important Thing You Can Do to Fight Climate Change: Talk About It," *TED*, published November 2018, accessed 13 March 2019, [https://www.ted.com/talks/katharine\\_hayhoe\\_the\\_most\\_important\\_thing\\_you\\_can\\_do\\_to\\_fight\\_climate\\_change\\_talk\\_about\\_it?language=en](https://www.ted.com/talks/katharine_hayhoe_the_most_important_thing_you_can_do_to_fight_climate_change_talk_about_it?language=en).

change as a topic independent of themselves, most people actually believe their stance as part of their intrinsic identity. Therefore, when there is a challenge to this stance, deniers see it as a personal affront. In order to limit this radicalization, Hayhoe says that commonality must be found. Employing this, the exhibit intends to create a safe space for all visitors. This will be done with the introductory section where the audience will build a positive and personal frame for the environment. They will be invited to walk on the grassy areas, wisp their hands through the waves of grain, climb the tree, and embrace all the natural scents and sounds the sensory room has to offer. The space is to be a reminder of the beauty and simplicity of nature, the joys of childhood, and the peace of Mother Nature. In creating this tranquil atmosphere, the exhibit is welcoming the audience and creating a familiar relationship with each member. This relationship will stand as the foundation of commonality Hayhoe recommends and will increase trust so deniers will be more receptive to the message.

Another aspect of the audience which bares consideration is accessibility. The Smithsonian National Museum of Natural History (NMNH) has a mission of, “Understanding the natural world and our place in it.”<sup>7</sup> This is in addition to the major goal of all Smithsonian museums which is, “The increase and diffusion of knowledge.”<sup>8</sup> In order to ensure that the greatest amount of knowledge of the natural world is diffused across the population, the institution must achieve exceptional accessibility. Ambrose and Paine identify six major barriers to accessibility that most museums construct: financial, physical, sensory, organizational,

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<sup>7</sup> “About the Museum,” *National Museum of Natural History*, accessed 13 March 2019, <https://naturalhistory.si.edu/about>.

<sup>8</sup> “Purpose and Vision,” *Smithsonian*, accessed 13 March 2019, <https://www.si.edu/about/mission>.

intellectual, and social/cultural.<sup>9</sup> Financially, there are no constraints upon the public. Admission to the NMNH is free unless otherwise noted.<sup>10</sup> The museum is open every day except December 25th, barring unforeseen circumstances.<sup>11</sup> The NMNH has also done everything within their power to ensure that people of varying abilities have access to the museum and exhibits. All exhibits, food spaces, and bathrooms are wheelchair accessible. All video presentations include open captioning, listening devices are available upon request, and sign language interpretation is available upon request. Tactile objects are available throughout the museum and verbally-described tours are available upon request. The accommodations provided for individuals in need of a unique visual or auditory experience overcome many sensory challenges.<sup>12</sup> However, there are other visitors who have unique sensory needs, such as separation from large crowds and loud noises. The NMNH has also found a way to meet these needs with their Mornings at the Museum program.<sup>13</sup> These programs limit the number of attendees and only allow entrance to those who require dimmed lights, low-noise, significantly less people, predictable transition, and more sensory objects.

Organizationally, the NMNH does its best to ensure that all signs are easy to read, the layout is easy to follow, there is plenty of seating, the pace of stimulus is not overwhelming,

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<sup>9</sup> Ambrose and Paine, *Museum Basics*, 28-31.

<sup>10</sup> “Visit,” *National Museum of Natural History*, accessed 13 March 2019, <https://naturalhistory.si.edu/visit>.

<sup>11</sup> This year the museum was closed for multiple days this year due to the government shutdown. See “Update Jan. 2: Smithsonian Statement on Government Shutdown: All Smithsonian Museums and the National Zoo are closed effective Jan. 2,” *Smithsonian*, 2 January 2019, accessed 14 March 2019, <https://www.si.edu/newsdesk/releases/update-jan-2-smithsonian-statement-government-shutdown>.

<sup>12</sup> Ambrose and Paine, *Museum Basics*, 51-55.

<sup>13</sup> Aditi Shrikant, “How Museums Are Becoming More Sensory-Friendly For Those With Autism,” *Smithsonian.com*, 5 January 2018, accessed 13 March 2019, <https://www.smithsonianmag.com/innovation/how-museums-are-becoming-more-sensory-friendly-for-those-with-autism-180967740/>.

there are easy to find food and drink areas, and there is time for psychological orientation when leaving the busy street and entering into the exhibits proper. The street entrance is on the lowest level and leads into a large room with minimal exhibit pieces. The National Mall entrance opens into the rotunda where the main elephant and the kiosk are the central foci. Intellectually, the exhibits, staff, and building are very receptive towards all people of all walks of life. The National Museum of Natural History is geared towards people of all ages. They offer multiple programs for grade school children and their families.<sup>14</sup> The labels accompanying materials are easy to read and not significantly challenging intellectually. The Smithsonian Institution Building, better known as ‘The Castle,’ also offers multilingual services for visitors whose first language is not English.<sup>15</sup> Beyond addressing the language barrier, the NMNH also works to achieve social and cultural comfort with all people by showing many artifacts of numerous different cultures will respect and awareness.

In order to achieve the highest levels possible of accessibility, *Contemplating Climate Change* will utilize the systems and programs already in place and continue them within the physical space itself. The sensory room at the beginning will allow a physical element which will appeal to a variety of visitors who prefer sensory objects, which includes most children. The collective Smithsonian Institutions provided educational experiences to over 11 million kids in 2018.<sup>16</sup> It also serves to make the exhibit more accessible to those with varying needs, such as

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<sup>14</sup> “Department of Education,” *National Museum of Natural History*, accessed 13 March 2019, <https://naturalhistory.si.edu/education>.

<sup>15</sup> “Smithsonian Institution Building,” *Smithsonian*, accessed 13 March 2019, <https://www.si.edu/museums/smithsonian-institution-building>.

<sup>16</sup> “Public Engagement,” *Smithsonian*, accessed 14 March 2019, <https://www.si.edu/dashboard/public-engagement#website-visitors>.

the visitors of the Mornings at the Museum program. Beyond that, the auditory and olfactory portions of the environment will ensure that attendees with vision problems have an additional avenue of interaction. For each main label, there will be two secondary labels. One shall be in Spanish and the other shall be in Braille. It is estimated that 41 million people in the United States speak Spanish at home.<sup>17</sup> Thus, recognizing the increasing bilingual nature of our nation will allow Spanish-speakers access to the materials and will also increase comfort of other minority groups. They will notice the steps the NMNH is making to being an inclusive environment and it will make them feel more welcome. Incorporation of Braille, though not required by the Americans with Disabilities Act of 1990, as there are interpreter services on hand, is another vital step to increasing the relational capacity with the audience.<sup>18</sup> However, going above the legal expectation shows that the NMNH genuinely cares about all visitors and wants to provide an equal experience. Furthermore, it increases the rest of the audience's altruistic understanding because they are participating in a space that is welcoming of all people.

While it would be ideal to offer the exhibit in as many languages as possible, it is not as fiscally feasible. That is why *Contemplating Climate Change* will utilize the other services provided by the Smithsonian Institutions including language interpreters. There will also be access to special groups, like the "Mornings at the Museum" program for those with more complex requirements. Even service dogs will be allowed into the space.<sup>19</sup> In keeping with the

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<sup>17</sup> "Hispanics in the US Fast Facts," *CNN*, written 6 March 2019, accessed 14 March 2019, <https://www.cnn.com/2013/09/20/us/hispanics-in-the-u-s-/index.html>.

<sup>18</sup> "Effective Communication," *Americans with Disabilities Act*, accessed 14 March 2019, <https://adata.org/factsheet/communication>.

<sup>19</sup> "Accessibility Information," *National Museum of Natural History*, accessed 14 March 2019, <https://naturalhistory.si.edu/visit/accessibility>.



mission, the overall goal is to increase and diffuse knowledge; however, even the most considerate museum is limited by physical location. There will still be people unable to visit due to travel limitations or physical barriers because their needs cannot be met...or can they?

The NMNH is extremely unique in that they offer an entirely virtual experience of permanent exhibits, past exhibits, and even other tours which include archives.<sup>20</sup> The permanent exhibit and past exhibit virtual tours are completely devoid of people and actually put the audience in control.<sup>21</sup> Visitors have 360 degree access to the exhibits and can look up, down, and turn in a circle. They can also zoom in and out to read text. *Contemplating Climate Change* will also utilize this feature. This will allow even greater access to the museum. In 2018, 1.7 million people visited the National Museum of Natural History website.<sup>22</sup> Factoring the number in, that is a substantial addition to the physical audience which can be reached by climate history. Digitization opens an entirely new realm of possibility. Before, virtual exhibits used to be static pictures and accompanying text. Now, virtual museums are an extension of the physical space which allows users to discover digitally just as they would physically. On the value of digital exhibits Dr. Erkki Huhtamo states:

Here the exhibits are no longer seen as separate entities put on display in any space. Instead, they are considered integral elements of a total environment that envelops the visitors and encourages them into dynamic relationship with the space and all its dimensions and elements. The environment comprises different media and channels of

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<sup>20</sup> “About the Museum: Museum Virtual Tours,” *National Museum of Natural History*, accessed 14 March 2019, <https://naturalhistory.si.edu/about/virtual-tour>.

<sup>21</sup> “Permanent Exhibits Virtual Tour,” *National Museum of Natural History*, accessed 14 March 2019, [https://naturalhistory2.si.edu/vt3/NMNH/z\\_NMNH-016.html](https://naturalhistory2.si.edu/vt3/NMNH/z_NMNH-016.html).

“Past Exhibits Tours: Fossil Lab,” *National Museum of Natural History*, accessed 14 March 2019, [https://naturalhistory2.si.edu/vt3/NMNH-FH/z\\_NMNH-FH-021.html](https://naturalhistory2.si.edu/vt3/NMNH-FH/z_NMNH-FH-021.html).

<sup>22</sup> “Public Engagement,” *Smithsonian*, accessed 14 March 2019, <https://www.si.edu/dashboard/public-engagement#website-visitors>.

communication. Instead of a passive spectator in front of static exhibits, the visitor is meant to turn into an active participant.<sup>23</sup>

According to the American Historical Association, active engagement and creating critical dialogue is the purpose of historical research.<sup>24</sup> If we expect critical dialogue in the physical institution, then we must present the digital information in a dynamic way in order to capture the minds of the users. The NMNH does just that, therefore using these digital resources will only serve to support objective of *Contemplating Climate Change*.

This exhibit is being created with the National Museum of Natural History for two reasons besides exceptional accessibility. First, this museum is a frequently trafficked space. In 2018, there were over 4.8 million visitors.<sup>25</sup> In 2017, the NMNH was the seventh most visited museum in the world.<sup>26</sup> This means that there will be a great level of exposure for all people from all walks of life to the exhibit. Second, the central location of the National Mall in the United States' capital is of pivotal importance. To begin with, it ensures a large tourist presence. There will be many people coming to see the White House, embrace the historic monuments, and follow the footsteps in our creation of democracy. There will also be local attendees from the DC area and political members from other cities, states, and countries here on business. This means that the people who have the greatest presence in the fight for environmental change could be attendees. What's more, it is difficult to ignore the political atmosphere of being in Washington

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<sup>23</sup> Erkki Huhtamo, "On the Origins of Virtual Museums," in *Museums in a Digital Age*, edited by Ross Parry (New York, NY: Routledge, 2010), 125.

<sup>24</sup> "Statement on Standards of Professional Conduct (updated 2019)," *American Historical Association*, accessed 14 March 2019, <https://www.historians.org/jobs-and-professional-development/statements-standards-and-guidelines-of-the-discipline/statement-on-standards-of-professional-conduct>.

<sup>25</sup> "Visitor Stats," *Smithsonian*, accessed 14 March 2019, <https://www.si.edu/newsdesk/about/stats>.

<sup>26</sup> Marine Hunter, "World's 20 Most Popular Museums," *CNN*, 25 May 2018, accessed 14 March 2019, <https://www.cnn.com/travel/article/most-popular-museums-world-2017/index.html>.

DC. The history of our great nation is permeating the air and it makes visitors ripe to evaluate political controversies and formulate new opinions.

### Chapter 4: Budgetary Consideration and Staffing

Room	Item Name	Description	Provider	Cost	Transportation Cost
Entrance/Grass Room	Song of the Open Road License, by Walt Whitman	Poem (words only)	No Copyright	Free	-
	Amber Waves	Art installation	Local Artist	\$150	\$39.95 per day plus \$0.99 per mile  Projected at \$500
	Bench	Museum object	NMNH	Free	-
	Recycled Trees	Art installation	Angela Haseltine Pozzi and associates	\$1,700 (time)	Paid
	Recycled Astroturf	Art installation	Local Astroturf Recycling Company	Donate or \$150	\$100
	Padding below Astroturf	Art installation	Local Astroturf Recycling Company	Donate Or \$100	Paid
	Recycled Tire Swing	Art installation	Angela Haseltine Pozzi and associates	\$50 (time)	Paid

	Recycled bridge crossing	Art installation	Angela Haseltine Pozzi and associates	\$200 (time)	Paid
	Arbor Vitae License, Siegfried Sassoon	Poem (words only)	Estate c/o Barbara Levy Agency, London  Or Faber & Faber	\$200	-
Tree Climb Room	The Negro Speaks of Rivers License, Langston Hughes	Poem (words only)	The Estate of Langston Hughes	Free or \$200	-
	Stairs/Ramp	Art installation	NMNH staff	\$100	-
	River	Art installation	Local Artist	\$200	\$100
Tide Pool Room	By the Sea license, Emily Dickinson	Poem (words only)	Harvard University Press	Free or \$200	-
	Recycled Tide Pools	Art installation	Angela Haseltine Pozzi and associates	\$500	Paid
	Recycled jellyfish tube	Art installation	NMNH staff	\$75	-
Los Angeles Smog Wall	Smog in LA Jan. 5, 1948	Photograph	Los Angeles Times Photographic Archive/	Free	Flat \$100

			UCLA Library		
	Highland Park Optimist Club	Photograph	L.A. Daily News/Los Angeles Times Photographic Archive/ UCLA Library	Free	Paid
	Pedestrians on Broadway 1958	Photograph	Herald-Examiner Collection/ Los Angeles Public Library	Free	Paid
	Afton Slade, president of Stamp Out Smog 1964	Photograph	Los Angeles Times Photographic Archive/ UCLA Library	Free	Paid
	The skyline of downtown Los Angeles 1956	Photograph	Getty Images	10 at \$300	-
	“fresh air task force” 1958	Photograph	Bettmann Archive via Getty Images	10 at \$300	-
	Smog Suit Replica	Art installation	NMNH staff	\$75	-
	“Fume Storm Spurs Quest for Remedy,” <i>Los Angeles Times</i>	Replica Newspaper	Newspapers.com	One time fee at \$300	-



	"Storm Over Fumes Grows (Continued from First Page)," <i>Los Angeles Times</i>	Replica Newspaper	Newspapers.com	Paid	-
	"Letters from Readers Opinions of the People," <i>Los Angeles Times</i>	Replica Newspaper	Newspapers.com	Paid	-
	"Los Angeles' Smog Drifts Over Valley, Auto Club Survey Shows," <i>San Bernardino County Sun</i>	Replica Newspaper	Newspapers.com	Paid	-
	Grace Verne Silver, "Letter to the editor," <i>Los Angeles Times</i>	Replica Newspaper	Newspapers.com	Paid	-
Donora Smog Wall	Smog in Donora	Photograph	Donora Smog Museum	Free	Flat \$150
	A nurse administers oxygen to a person suffering during the Donora Smog episode	Photograph	Corbis-Bettmann / Getty	10 at \$300	-
	Donora Zinc	Photograph	Donora Smog	Free	Paid

	Works		Museum		
	Image of Donora Street	Photograph	Corbis-Bettmann /Getty/ Smithsonian already has license	Should be free	-
	Patients In Oxygen-Tented Beds, Donora, Pennsylvania, November 3, 1948	Photograph	Corbis-Bettmann / Getty/ Smithsonian already has license	Should be free	-
	Donora Smog Dome	Functioning Model of Recycled Materials	Local Artists	\$300	Paid
	Gas Mask and Tank	Artifact	Donora Smog Museum	Free	Paid
	“Donora Smog Deaths Probed,” <i>Pittsburgh Press</i>	Replica Newspaper	Newspapers.com	Paid	-
	“Death at Donora Investigated: Authorities Seek Cause of Disaster (Continued from Page One),” <i>Pittsburgh</i>	Replica Newspaper	Newspapers.com	Paid	-

	<i>Press</i>				
	“Polluted Air May Cause Cancer, Report on Donora Smog Reveals,” <i>Pittsburgh Sun-Telegraph</i>	Replica Newspaper	Newspapers.com	Paid	-
	“2 Donora Smog Victims Who Took Trip South Die Within 24 Hours,” <i>Pittsburgh Press</i>	Replica Newspaper	Newspapers.com	Paid	-
Clean Air Act Wall	Nixon Signing	Photograph	Donora Smog Museum	Free	-
	Donora Smog Plaque Replica	Replica Plaque	Donora Smog Museum	\$30	-
	“U.S. Deadlines on Exhaust Anger Auto Experts,” <i>Detroit Free Press</i>	Newspaper	Newspapers.com	Paid	-
	“Pollution,” <i>Los Angeles Times</i>	Newspaper	Newspapers.com	Paid	-
Cuyahoga River Fire Wall	Cuyahoga River fire, 1952 - Jefferson St. and W. 3rd.	Photograph	Michael Schwartz Library at Cleveland State	Free	Flat \$100

			University		
	Cuyahoga River fire, 1948	Photograph	Michael Schwartz Library at Cleveland State University	Free	Paid
	Cuyahoga River fire, 1952, Jefferson St. & W. 3rd	Photograph	Michael Schwartz Library at Cleveland State University	Free	Paid
	Fireboat breaking up oil slick on the Cuyahoga River, 1961	Photograph	Michael Schwartz Library at Cleveland State University	Free	Paid
	Councilmen from Cleveland, Ohio examine a white cloth	Photograph	Jerry Horton	Free	\$20
	Cuyahoga Fire Dome	Functioning Model of Recycled Materials	Local Artists	\$200	Paid
Rachel Carson and DDT Wall	Rachel Carson with Microscope, 1962	Photograph	Chatham University-Collection on Rachel Carson	Free	\$30
	1955. Ford tri-	Photograph	USDA Forest	Free	-

	motor spraying DDT. Western spruce budworm control project. Powder River control unit, Oregon.		Service, Pacific Northwest Region, State and Private Forestry, Forest Health Protection.  Portland Station Collection; La Grande, Oregon.		
	Bioaccumulation Chart	Chart	World Wildlife Federation	Free	-
	Men Spraying DDT	Photograph	Public Domain		-
	Protect Your Children Against Disease-Carrying Insects!	Advertisement	Science History Institute	Free	\$30
	Rachel Carson's Robins	Artifact	MSU Museum	Free	\$45
	"SCIENCE: Experts Sound a Warning-Bug-Bombs Can Be Lethal Too," <i>Daily News</i>	Newspaper	Newspapers.com	Paid	-

	Polluted Water Structure	Art installation	NMNH staff	\$100	-
	Silent Spring Manuscript	Artifact	Yale University Library Beinecke Rare Book & Manuscript Library	Free	\$100
	Online Silent Spring Manuscript	Interactive Artifact	Internet Archive	Free	-
Clean Water Act Wall	JFK signing Amendment to the Federal Water Pollution Control Act	Photograph	John F. Kennedy Presidential Library and Museum	Free	\$30
	“Help!” Political Cartoon, 1969.	Newspaper	Cleveland State University Library Special Collections. Cleveland Press Collection. Bill Roberts Editorial Cartoon Collection.	Free	-
	Susan Fogg, “Active Planning Under Way to Save Great Lakes,” <i>The Times</i>	Newspaper	Newspapers.com	Paid	-



	<i>Recorder</i>				
	“Kansas Has Good Start on Pollution Control,” <i>The Manhattan Mercury</i> ,	Newspaper	Newspapers.com	Paid	-
	Kenneth J. Fanucchi, “San Fernando Revives Plan for Sewage Plant,” <i>Los Angeles Times</i>	Newspaper	Newspapers.com	Paid	-
	Bench	Museum Object	NMNH	Free	-
Climate Change Room	Svante Arrhenius Portrait	Artifact	The University of Pennsylvania Libraries- The Edgar Fahs Memorial Collection	Free	\$30
	Tablet I: <i>On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground</i>	Interactive Artifact	Internet Archive	Free	-
	Online text	Interactive Artifact	Internet Archive	Free	-
	Berkley Writers,	Newspaper	Newspapers.com	Paid	\$30

	“Professor Will Return To Old World,” <i>Oakland Tribune</i>				
	Guy Stewart Callendar Portrait	Artifact	University of East Anglia- The G.S. Callendar Archive	Free	\$30
	Callendar Chart	Photograph	Public Domain	Free	-
	Haagen-Smit Performing Experiment	Photograph	Caltech Archives	Free	Flat \$30
	The professor whips up a batch of Haagen-Smog	Photograph	Caltech Archives	Free	Paid
	“Scientist Says Better Engines Would Reduce Smog,” <i>Bakersfield Californian</i>	Newspaper	Newspapers.com	Paid	-
	Tablet II: <i>Chemistry and Physiology of Los Angeles Smog</i> By A. J. Haagen-Smit	Interactive Artifact	Semantic Scholar	Free	-
	Online text <i>Chemistry and Physiology of</i>	Interactive Artifact	Semantic Scholar	Free	-

	<i>Los Angeles Smog</i>				
	Face Masks of Peking University Statues	Photograph	SINA WEIBO	\$50	-
	Beijing Smog	Photograph	China Foto Press/ Getty Images	10 at \$300	-
	Brother Nut near the Beijing National Stadium on Nov. 15	Photograph	Dong Dalu/CFP	\$50	-
	Smog Brick	Artifact	Brother Nut	Free	Flat \$200
	Vacuum	Artifact	Brother Nut	Free	Paid
Transparent Wall Space	Transparent Wall	Museum Object	NMNH	\$200	-
	Tablets I, II, III	Museum Object	NMNH	Free	-
	Keeling Curve Data	Interactive Artifact	Scripps Institution of Oceanography	Free	-
	Recycled Albatross	Art Installation	Angela Haseltine Pozzi and associates	\$150	Paid
	Albatross Stomach Tube	Artifact	Monterey Bay Aquarium	Free	\$50
	Plastic Ocean Wave Tank	Art Installation		\$300	-

	Trash Waves Indonesia	Photograph	Zak Noyle/ A- Frame	\$300	\$20
	Marine Debris Map	Photograph	NOAA	Free	-
Animal and Climate Art	The Lorax	Interactive Artifact	Dr. Seuss Enterprises	\$200	-
	Koala Photograph	Photograph	Wired	Free	-
	Seal Photograph	Photograph	Alamy	\$200	-
	Dead Fish Photograph	Photograph	Leo Correa	\$150	-
	Mae West Turtle Photograph	Photograph	5Gyres	Free	-
	Rhino Photograph	Photograph	Jilary O’Leary/ California Academy of Sciences	\$200	-
	Giraffe Photograph	Photograph	Paras Chandaria/ California Academy of Sciences	\$200	-
	Bird in Oil Photograph	Photograph	Getty	10 for \$300	-
	Animals eating washed up garbage in water	Photograph	Getty	10 for \$300	-

The Choices	Man holding drinking straw from plastic pollution collected on beach, North East England, UK	Photograph	Getty	10 for \$300	-
	Smiling young businessman commuting, riding bicycle on sunny urban street	Photograph	Getty	10 for \$300	-
	Still life of plastic bottles, source of pollution	Photograph	Getty	10 for \$300	-
	Green/Sustainable Living  Christmas tree made of recycled plastic bottles	Photograph	Getty	10 for \$300	-
	Close up hand throwing empty plastic bottle into the trash	Photograph	Getty	10 for \$300	-
	Reusable straws	Artifact	Greens Steel	\$8.99	-
	Reusable Water Bottle	Artifact	Hydro Flask	\$43.00	-

	A beautiful senior Mexican woman at the voting booth	Photograph	Getty	10 for \$300	-
	'This is the U.S. Capitol during the Bicentennial of the Constitution Celebration	Photograph	Getty	\$375	-
	Smithsonian bag	Artifact	Cafe Press/ NMNH	Free	-
Miscellaneous	Wall lettering	Museum Object	NMNH	In house	-
	Plaques	Museum Object	NMNH	In house	-
	Wall Paintings	Museum Object	NMNH	In house	-
	Aromatherapy	Aroma Device	Store	\$300	
	Tablet Stands	Museum Object	NMNH	In house	-
	Climate Controlled Display Cases	Museum Object	NMNH	In house	-
	Art Backings (photographs)	Museum Object	NMNH	In house	-
	Paper Printing (newspapers)	Museum Object	NMNH	In house	-
				<b>~\$7, 600</b>	<b>~\$1, 800</b>
	Buffer for additional			\$1,000	\$1,000



	needs				
				<b>\$8,600</b>	<b>\$2,800</b>
	Doubled to allow for two years access and upkeep			<b>\$17,200</b>	<b>\$5,600</b>
<b>TOTAL:</b>					<b>\$22,800</b>

**Figure 102: Budget Table**

The Smithsonian Fiscal Year 2019 Federal Budget request is \$957 million.<sup>1</sup> These funds are to be split amongst the nineteen Smithsonian museums, the zoo, and nine research centers and educational units.<sup>2</sup> \$220 million has been requested for facilities with the bulk of the money, \$127 million going to the National Air and Space Museum for their renovations and new exhibits. Other institutions undergoing large renovations take the rest of the bulk. This leaves \$17 million available for other institutions, like the National Museum of Natural History, to plan and design future exhibits. The budget also includes salaries and expenses. The expected allotted amount is set at \$738 million. About \$3.5 million is going to inflation in rent, utilities, and communication. The \$738 million also includes \$5 million for, “stabilizing the overall condition of the buildings and replacing security equipment.”<sup>3</sup> That leaves \$726.5 million to cover staffing

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<sup>1</sup> Linda St. Thomas, “Smithsonian Fiscal Year 2019 Federal Budget Request Totals \$957 Million,” *Smithsonian*, 15 February 2019, accessed 6 April 2019, <https://www.si.edu/newsdesk/releases/smithsonian-fiscal-year-2019-federal-budget-request-totals-957-million>.

<sup>2</sup> Linda St. Thomas “The Smithsonian Institution Fact Sheet,” *Smithsonian*, 14 February 2019, accessed 6 April 2019, <https://www.si.edu/newsdesk/factsheets/smithsonian-institution-fact-sheet>.

<sup>3</sup> “Smithsonian Affiliations,” *Smithsonian*, accessed 14 April 2019, <https://affiliations.si.edu/si-edu/>.

costs. For the 2019 fiscal year, the Smithsonian was granted \$1 billion which allows an extra \$43 million cushion for various project and staffing needs.<sup>4</sup>

As it is, the budget only serves to cover about 70% of the costs of the museums.<sup>5</sup> In the words of Smithsonian staff, “Private philanthropy bridges the gap between the Federal resources the Smithsonian receives and what it needs to carry out innovative research, expand its national collections, build new facilities, open truly 21st-century exhibitions and expand educational outreach to school-aged children.”<sup>6</sup> Ways to support the museum include tiered memberships, large monetary gifts, corporate and foundation relations/gifts, small donation collection boxes within the museums, and purchases at museum stores.<sup>7</sup> In 2018, the Smithsonian ran a fundraising campaign encompassing the nineteen museums, zoo, and nine research and educational endeavors.<sup>8</sup> Over 535,000 people contributed various sized gifts from over 107 different countries. The total amount contributed ended up at over \$1.88 billion. As this more than doubles the amount provided by the government, patrons easily covered the 30% of extra costs that were not accounted for in the fiscal budget.

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<sup>4</sup> Linda St. Thomas, “Smithsonian Fiscal Year 2019 Federal Budget Totals \$1 Billion,” *Smithsonian*, 26 February 2019, accessed 6 April 2019, <https://www.si.edu/newsdesk/releases/smithsonian-fiscal-year-2019-federal-budget-totals-1-billion>.

<sup>5</sup> “FAQs: Answers to frequently asked questions about donating to the Smithsonian,” *Smithsonian*, accessed 6 April 2019, <https://giving.si.edu/faqs>.

<sup>6</sup> “FAQs: Answers.”

<sup>7</sup> “Friends of the Smithsonian: Every membership provides the Smithsonian with the philanthropic support we need to thrive,” *Smithsonian*, accessed 6 April 2019, <https://giving.si.edu/membership>.

“Working at the Smithsonian: Fundraising,” *Smithsonian*, accessed 6 April 2019, [https://www.si.edu/OHR/workingsi\\_fundraising](https://www.si.edu/OHR/workingsi_fundraising).

<sup>8</sup> Linda St. Thomas, “Smithsonian Concludes Capital Campaign With \$1.88 Billion in Private Support,” *Smithsonian*, 6 February 2018, accessed 6 April 2019, <https://www.si.edu/newsdesk/releases/smithsonian-concludes-capital-campaign-188-billion-private-support>.

Due to the extremely effective budgeting of the Smithsonian and their very strong fundraising campaigns, there are no significant budgetary constraints. Thus, the amount required for this climate change project should be attainable. However, it is best to cover all eventualities. In the instance of additional funding being required at various institutions, two special climate change events will be held at the National Museum of Natural History after hours. These events will partner with local catering companies to provide a black tie dinner service in the rotunda with tickets prices directly contributing to the exhibit. Foods that will be served will be in season and on lists of most environmentally friendly and sustainable foods.<sup>9</sup> During dinner, there will be orchestral music provided by members of the National Symphony Orchestra.<sup>10</sup> Following dinner, patrons will have access to all the museum exhibits including the *Contemplating Climate Change* exhibit. The exhibit will be created before full funding has been met and will be paid after the two events have taken place. The draw for the events will be early access to the exhibit itself. Ticket offers will be sent to various members beginning with the upper tiers and moving down. If there are any tickets left, they will be released to the public. Some tickets will also be sent to various political persons who support climate change measures.

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<sup>9</sup> Kate Good, "Dine with the Planet in Mind: Top 10 Eco-Friendly Foods," *One Green Planet*, 2014, accessed 6 April 2019, <https://www.onegreenplanet.org/animalsandnature/top-10-eco-friendly-foods/>.

Tamara Green, "15 Eco-Friendly Food Swaps You Need to Make Now," *Food Network Canada*, 12 April 2017, accessed 6 April 2019, <https://www.foodnetwork.ca/healthy-eating/photos/eco-friendly-food-swaps-earth-day/#!vegan-lasagna>.

<sup>10</sup> "National Symphony Orchestra," *National Symphony Orchestra*, accessed 6 April 2019, <http://www.kennedy-center.org/nso/index>.

Staffing needs will not exceed the already well-staffed Smithsonian Institutions. The staff of the National Museum of Natural History is very adept and renowned for their talents.<sup>11</sup> The beauty of the Smithsonian Institution encompassing nineteen different museums is that if there is a specific talent required, such as creating replica newspapers or enlarging, enhancing, and matting a photograph, then the job can simply be sent to that other institution where there is specialization. However, at over 450 scientific staff members strong, the NMNH has more than enough talented teams to oversee this job. No additional security members will be needed in order to ensure the safety of the artifacts. All visitor bags are checked upon arrival and all entrants must pass a metal detector test. Security officers are also posted intentionally about exhibit spaces in addition to roving security guards. All museum spaces are remotely monitored via camera. Salaries and other staffing costs are covered in the Smithsonian Fiscal Year 2019 Federal Budget and no additional costs are expected.

In order to ensure that the public is gaining access to primary source material, the National Museum of Natural History will be working in collaboration with various institutions, corporate bodies, and individuals across the globe. The bulk of the monies listed within the budget are for licensing fees and payments for art installations. A large amount of the images and newspapers appearing within the exhibit will be reproductions of primary artifacts instead of the artifacts themselves. The reasoning behind this is threefold. First, it allows better access to the materials. Enlarging images makes them more accessible and visible to the audience. Also, creating replica newspapers, which lend themselves to kinesthetic interaction, increases audience participation with the exhibit and is more likely to result in dynamic conversations about the

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<sup>11</sup> “Scientific Staff,” *Smithsonian: National Museum of Natural History*, accessed 6 April 2019, <https://naturalhistory.si.edu/scientific-staff>.

topic at hand. Second, it also allows those primary sources to continue to be accessible at the various institutions holding them. This means researchers and other interested audiences will still have access to the majority of artifacts at the other archives. Third, by still having the majority of artifacts within their own archives, the collaborators will be more inclined to allow digital loans of the materials, especially knowing a credit will be added to each label showing their support of the climate venture. As for the physical artifacts, monetary payments will be allotted to allow the exhibit to use the materials for the two years in question.

## Chapter 5: Recommendations

In order to implement this project, it is necessary to ensure that there are no budget cuts in the coming fiscal year. The government already granted the Smithsonian \$1 billion for 2019.<sup>1</sup> Most of this was for renovations, but there was around a \$17 million cushion available for new exhibits. In addition, there are the monies left over from the 2018 fundraising campaign which totaled \$1.88 billion.<sup>2</sup> Should these funds run out and the prospected NMNH fundraising dinner outlined in the budget section not pan out, it is essential to look at the possibility of addressing this obstacle by moving the project to the coming fiscal year. The federal budget request for 2020 totals \$978 million.<sup>3</sup> There will be another \$17 million available for new exhibits. Seeing as the NMNH would be put on hold during 2019, it is more likely that the museum will have priority in the coming year, ensuring that that *Contemplating Climate Change* exhibit gets made. The 2019 and the 2020 budgets allot for staffing with \$740 million and \$759 million sums available to continue attracting the best minds and delivering the best exhibits. Seeing as this project has a projected opening date of the second week of January 2021, the multiple budgets should be able to cover the cost. As there are no additional staffing positions required to create or present this exhibit, there are no projected issues with staffing.

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<sup>1</sup> Linda St. Thomas, “Smithsonian Fiscal Year 2019 Federal Budget Totals \$1 Billion,” *Smithsonian*, 26 February 2019, accessed 6 April 2019, <https://www.si.edu/newsdesk/releases/smithsonian-fiscal-year-2019-federal-budget-totals-1-billion>.

<sup>2</sup> Linda St. Thomas, “Smithsonian Concludes Capital Campaign With \$1.88 Billion in Private Support,” *Smithsonian*, 6 February 2018, accessed 6 April 2019, <https://www.si.edu/newsdesk/releases/smithsonian-concludes-capital-campaign-188-billion-private-support>.

<sup>3</sup> Linda St. Thomas, “Smithsonian Fiscal Year 2020 Federal Budget Request Totals \$978 Million,” *Smithsonian*, 18 March 2019, accessed 8 April 2019, <https://www.si.edu/newsdesk/releases/smithsonian-fiscal-year-2020-federal-budget-request-totals-978-million>.

Beyond budget, the next step of implementation is to consider the audience and their interest in the subject matter. As this is a topic which shows up in headlines daily, including everything from the allergies to the border crisis, it is obvious that the majority of visitors would have some investment in the topic, even if it were saying that climate change isn't real.<sup>4</sup> Paired with the research outlined in the *Audience* section of this project, there should be a significant draw to the exhibit.

Recognizing these factors, it would be safe to move into physical implementation of the project. First, people holding copyrights and primary source material would be contacted. The *Budget* section has each piece within the exhibit itemized and includes who to contact for copyright and requests. Second, it would be necessary to contact the artists who will be making the installations. These items will take a large amount of time to put together and it is best to allow them to get started as soon as possible so the exhibit is not limited by an installation falling behind schedule. Third, it would be necessary to select a date to start preparing the space. Currently, there is an exhibit called *Outbreak: Epidemics in a Connected World* in the intended room and is projected to stay open until 2021.<sup>5</sup> That means that *Contemplating Climate Change* would not open until 2021. This is opportune because it allows additional time look at funds from the 2019 budget, the 2020 budget, and the fundraising from 2018 to see if the cost is entirely covered. Also, this time frame allows the archives and the NMNH plenty of time to draft

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<sup>4</sup> Letter to the Editor, "Climate change is a big part of our nation's border crisis," *Chicago Sun Times*, 8 April 2019, accessed 8 April 2019, <https://chicago.suntimes.com/opinion/climate-change-border-crisis-southern-border-asylum-seekers-migrants/>.

Umair Irfan, "It's not your imagination. Allergy season gets worse every year," *Vox*, 8 April 2019, accessed 8 April 2019, <https://www.vox.com/2019/4/8/18300342/pollen-season-2019-allergies-climate-change>.

<sup>5</sup> "Outbreak: Epidemics in a Connected World," *Smithsonian: National Museum of Natural History*, accessed 10 April 2019, <https://naturalhistory.si.edu/exhibits/outbreak-epidemics-connected-world>.



agreements which appeal to all involved for rights and loans. In addition, the artists will not feel a significant time crunch in developing these unique installations and domes so the final products shall look impeccable. Hence, the projected start date for changing the exhibit shall be the first week of 2021.

Fourth, a new digital table will be mapped out with projected contact dates and deadlines for each piece of the project. There will be multiple columns identifying necessary information on each item. These shall include if rights have been accrued, who has given license to use these items, the start date for items that need to be physically created, various check-ins to assess project progress, and a projected end date. The hope is to have all completed items in the possession of the NMNH at least two to three weeks prior to the start of the 2021 New Year so as to ensure that the space can be readied as quickly as possible. Fifth, as it gets closer to the start date, it would do well to ensure that all equipment is available to digitally map the space so it can be accessible online. Sixth, if necessary, there will be requirements for creating and developing the potential fundraiser dinners to accrue the necessary funds to finish the project.

Another consideration for the development of this project will be copyright. Currently, the images and artifacts within this proposal have either been used with permission, have been paid for use, or fall under the Fair Use legislation of the United States.<sup>6</sup> According to this legislation, copyrighted material can be used for the purpose of the work, the nature of the material, sustainability, and effect on the market. Both Southern New Hampshire University and the National Museum of Natural History are educational institutions. NMNH specifically is a

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<sup>6</sup> “U.S. Copyright Office Fair Use Index,” *Copyright.gov*, accessed 18 May 2019, <https://www.copyright.gov/fair-use/index.html>.

“Measuring Fair Use: The Four Factors,” *Stanford University Libraries*, accessed 26 May 2019, [https://fairuse.stanford.edu/overview/fair-use/four-factors/#the\\_nature\\_of\\_the\\_copyrighted\\_work](https://fairuse.stanford.edu/overview/fair-use/four-factors/#the_nature_of_the_copyrighted_work).

nonprofit, which supports Fair Use. The nature of the materials varies, but the majority of them are not artistic in nature, hence there is more leeway in using factual and historic images. Smaller portions of these collections have been used, therefore they are sustainable. Finally, the overall effect on the market shall be minimal because almost all of these resources exist online or in institutions where the public has access. They can be viewed already without having to pay and would, therefore, have no effect on supply and demand.

In the course of creating this project, a dialogue has been opened with many of the archives that hold pieces which will be used/copied in this exhibit. They have been extremely helpful and willing to share resources to further public education. Hence, it is also unlikely that there should be an issue with acquiring rights to the primary sources. However, the three pieces which may prove most challenging will be the use of *The Lorax*, the various poems, and Brother Nut's smog bricks. There is much evidence showing that the rights to Dr. Seuss works can be very difficult to acquire.<sup>7</sup> As this is for public education and will not be used by a for-profit venture, the estate may be more inclined to allow the use of the story for the exhibit. There can also be challenges with rights to famous poetry, so there can be challenges with getting rights to the included prose. The exceptions are the Walt Whitman which has no copyright and the Langston Hughes because the Smithsonian's National Museum of African American History & Culture already has a Langston Hughes poem in it so there is a strong and positive relationship with that estate.<sup>8</sup> Thus far, people have offered Brother Nut large amounts of money to purchase

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<sup>7</sup> Scott Bomboy, "Dr. Seuss in the land of Fair Use lawsuits," *Constitution Daily*, 4 January 2018, accessed 26 April 2019, <https://constitutioncenter.org/blog/dr.-seuss-in-the-land-of-fair-use-lawsuits>.

<sup>8</sup> "Welcome," *National Museum of African American History & Culture*, accessed 14 April 2019, <https://nmaahc.si.edu/>.

a brick and he has refused.<sup>9</sup> The hope is that he would be willing to lend it to an institution who does not want to exploit it, but to educate the public on the very subject which is dear to his heart.

The audience will influence the development of their exhibit based upon their support of the Smithsonian museums and their support of the topic. Monetarily, fundraising is expected to cover the other 30 percent of the cost to create and run exhibits. Hence, it is important that the Smithsonian keeps good relationships with their stakeholders and the public at large. More importantly, it is necessary that topics presented at the NMNH are positively received. That is why routine surveys will be given out to visitors in order to gauge their receptivity and experience at the exhibit. There will be two styles of survey: informal and formal. The informal survey will stem from NMNH staff that will be posted inside and at the end of the exhibit. They will answer questions and casually strike up conversation about what visitors think of the space. These will then be electronically record significant findings. For the formal survey, members will be contacted electronically and asked to gauge their latest visit. The survey will be very brief, but analytical enough to garner viable data. In both cases, the staff will then go over the feedback to see what visitors think of *Contemplating Climate Change* and what can be improved.

Another way audience interaction will be essential to the development of the exhibit is through marketing. Social media campaigns will be undertaken using a variety of different platforms to increase audience awareness of and attendance to *Contemplating Climate Change*. The NMNH is already very effective at using their various social media accounts to engage the

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<sup>9</sup> Matt Rivers, "Chinese artist uses 'vacuum cleaner' to turn smog into brick," *CNN*, 8 December 2015, accessed 14 April 2019, <https://www.cnn.com/2015/12/08/asia/china-pollution-artist/index.html>.

audience before, during, and after a visit.<sup>10</sup> Marketing the exhibit in a provocative and exciting way will inspire audience members to visit, tell friends and family, and even return to the exhibit with others to experience the excitement this tactile space has to offer. Hence, utilizing it to enhance the experience and generate audience buy-in is logical.

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<sup>10</sup> “Smithsonian’s NMNH,” *Twitter*, accessed 26 April 2019, [https://twitter.com/NMNH?ref\\_src=twsrc%5Egoogle%7Ctwcamp%5Eserp%7Ctwgr%5Eauthor](https://twitter.com/NMNH?ref_src=twsrc%5Egoogle%7Ctwcamp%5Eserp%7Ctwgr%5Eauthor).

“Smithsonian’s NMNH,” *Instagram*, accessed 26 April 2019, <https://www.instagram.com/smithsoniannmnh/?hl=en>.

“Smithsonian’s National Museum of Natural History,” *YouTube*, accessed 26 April 2019, <https://www.youtube.com/user/smithsonianNMNH>.

“Smithsonian’s National Museum of Natural History,” *Facebook*, accessed 26 April 2019, <https://www.facebook.com/nmnh.fanpage/>.

## Conclusion

*Contemplating Climate Change* is undertaking a topic that is vital to our continued existence in a dynamic and engaging way. It intends to bridge the gap between disbelief and belief as well as the gap between belief and action. It shall accomplish this goal by separating the museum space into four different sections: the visceral, the visible, the invisible, and the choices. Each one utilizes psychological research to appeal to a variety of audience members in order to compel them to engage with the information in a dynamic and meaningful way. There is the visceral section which employs poetry and calls upon memory to develop a love of nature. Then, there is the visible section which utilizes historical research on the air toxicity events of Los Angeles and Donora as well as the water toxicity of the Cuyahoga River Fire and Rachel Carson's findings with DDT to build a case for environmentalism. Next, there is the invisible section which presents historical and scientific source material concerning climate change. This section also creates a connection back to the visceral by showing wildlife photography and asking the audience to contemplate the effect their actions have on life throughout the planet. Last, there is the choices section which empowers the audience to enact a meaningful change in their lives right now. All of these culminate in a space that is ready to change minds and create critical conversations concerning our place in the environment.

The audience has been identified and considered heavily throughout the decision-making process so as to change and motivate as many minds as possible. The budget has been deeply considered and all eventualities have been accounted for in order to ensure that this project can be up and running as easily as possible. There is a plan to ensure that audience feedback will be taken into consideration and the exhibit will be tailor-made for them to enjoy. Hopefully, by

visiting the physical location at the Smithsonian's National Museum of Natural History or visiting the virtually mapped exhibit online, guests will be called to lifestyle changes and conversation outside the space. This topic is universal. We all call the planet Earth home and we can all learn more to protect and preserve her existence.

## Bibliography

### Primary Sources:

- “2 Donora Smog Victims Who Took Trip South Die Within 24 Hours.” *Pittsburgh Press* (Pittsburg, PA). May 6, 1949. Accessed 28 March 2019. <https://www.newspapers.com/image/143369114/>.
- “32 oz Wide Mouth.” *Hydro Flask*. Accessed 20 April 2019. [https://www.hydroflask.com/32-oz-wide-bottle/color\\_lemon\\_a\\_92\\_o\\_66](https://www.hydroflask.com/32-oz-wide-bottle/color_lemon_a_92_o_66).
- 5 Gyres: Science to Solutions*. Accessed 20 April 2019. <https://www.5gyres.org/>.
- “1955. Ford tri-motor spraying DDT. Western spruce budworm control project. Powder River control unit, Oregon.” *USDA Forest Service* via *Flickr*. Accessed 22 April 2019. <https://www.flickr.com/photos/151887236@N05/33059292645/in/photostream/>.
- “Animals eating washed up garbage in water.” *Getty*. Accessed 20 April 2019. <https://www.gettyimages.com/detail/photo/animals-eating-washed-up-garbage-in-water-royalty-free-image/510586395>.
- “ARIE HAAGEN-SMIT.” *Caltech Archives*. Accessed 21 April 2019. <http://archives-dc.library.caltech.edu/islandora/object/ct1%3A3804>.
- Arrhenius, Svante. "On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground." *Philosophical Magazine and Journal of Science, series 5 volume 14* (April 1896): 237-276. Accessed 9 February 2019. <https://doi.org/10.1080/14786449608620846>.
- Arrhenius, Svante. "On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground." *Philosophical Magazine and Journal of Science, series 5 volume 14* (April 1896): 237-276. Accessed 21 April 2019. <https://archive.org/details/londonedinburgh5411896lon/page/236>.
- Askins, John. “U.S. Deadlines on Exhaust Anger Auto Experts.” *Detroit Free Press*, (Detroit, MI), 20 December 1970. Accessed 29 March 2019. <https://www.newspapers.com/image/98936008/?terms=clean%2Bair%2Bact>.
- Atwater, Asa. “Donora Smog Deaths Probed.” *Pittsburgh Press* (Pittsburg, PA), 1 November 1948. Accessed 28 March 2019. <https://www.newspapers.com/image/150042084/>.
- Barnwell, Aliya. “A Chinese artist made a solid brick of pollution by vacuuming smog out of the air.” *Digital Trends*. Written 9 December 2015. Accessed 19 March 2019. <https://www.digitaltrends.com/photography/chinese-artist-brick-of-pollution/>.



- Berkley Writers. "Professor Will Return To Old World." *Oakland Tribune* (Oakland, CA). 13 August 1904. Accessed 28 March 2019.  
<https://www.newspapers.com/image/71565599/?terms=svante%2Barrhenius>.
- "BILL SIGNING – HR 6441 PUBLIC LAW 87-88, AMENDMENT TO THE FEDERAL WATER POLLUTION CONTROL ACT, 12:21PM." *John F. Kennedy Presidential Library and Museum*. Accessed 21 April 2019. <https://www.jfklibrary.org/asset-viewer/archives/JFKWHP/1961/Month%2007/Day%2020/JFKWHP-1961-07-20-A>.
- Bing. "Face Masks on Peking University Statues Protest Beijing Smog." *chinaSmack*. Written 5 March 2014. Accessed 21 April 2019. <https://www.chinasmack.com/face-masks-on-peking-university-statues-protest-beijing-smog>.
- "Bioaccumulation Chart." *World Wildlife Federation*. Accessed 22 April 2019.  
[http://assets.panda.org/img/original/bioaccumulation\\_graphic.jpg](http://assets.panda.org/img/original/bioaccumulation_graphic.jpg).
- Boissoneault, Lorraine. "The Deadly Donora Smog of 1948 Spurred Environmental Protection—But Have We Forgotten the Lesson?" *Smithsonian*. 26 October 2018. Accessed 24 April 2019. <https://www.smithsonianmag.com/history/deadly-donora-smog-1948-spurred-environmental-protection-have-we-forgotten-lesson-180970533/>.
- "Brazil removes 50 tons of dead fish from Olympic waters." *Aljazeera America*. 21 April 2015. Accessed 20 April 29, 2019. <http://america.aljazeera.com/articles/2015/4/21/brazil-removes-50-tons-of-dead-fish-from-olympic-waters.html>.
- Breyer, Melissa. "DDT exposure quadruples breast cancer risk." *Treehugger*. 17 June 2015. Accessed 22 April 2019. <https://www.treehugger.com/sustainable-agriculture/ddt-exposure-quadruples-breast-cancer-risk.html>.
- Buckley, Chris and Adam Wu. "Amid Smog Wave, an Artist Molds a Potent Symbol of Beijing's Pollution." *The New York Times*. 1 December 2015. Accessed 21 April 2019. <https://www.nytimes.com/2015/12/02/world/asia/beijing-smog-air-pollution-artist-brick.html>.
- "Canvas Tote Bags: Museum of Natural History Tote Bag." *Café Press*. Accessed 20 April 2019. [https://www.cafepress.com/+museum\\_of\\_natural\\_history\\_tote\\_bag.393272984](https://www.cafepress.com/+museum_of_natural_history_tote_bag.393272984).
- Carson, Rachel. *Silent Spring*. Boston: First Mariner Books, 2002.
- Carson, Rachel. "Full Text of *Silent Spring*, *Internet Archive*. Accessed 22 April 2019. [https://archive.org/stream/fp\\_Silent\\_Spring-Rachel\\_Carson-1962/Silent\\_Spring-Rachel\\_Carson-1962\\_djvu.txt](https://archive.org/stream/fp_Silent_Spring-Rachel_Carson-1962/Silent_Spring-Rachel_Carson-1962_djvu.txt).

Chandaria, Paras. "Nairobi's Skyscrapers." In *Wonders: Spectacular Moments in Nature Photography*. San Francisco, CA: Chronicle Books, 2018.

"Councilman Katalinas, Henry Sinkiewicz and John Pilch examine cloth soaked in oil from the Cuyahoga River." *The Michael Schwartz Library at Cleveland State University*. Accessed 22 April 2019.

<http://images.ulib.csuohio.edu/cdm/singleitem/collection/press/id/10772/rec/13>.

"Cuyahoga River fire, 1948." *The Michael Schwartz Library at Cleveland State University*. Accessed 22 April 2019.

<http://images.ulib.csuohio.edu/cdm/singleitem/collection/press/id/599/rec/3>.

"Cuyahoga River fire, 1952, Jefferson St. & W. 3<sup>rd</sup>." *The Michael Schwartz Library at Cleveland State University*. Accessed 22 April 2019.

<http://images.ulib.csuohio.edu/cdm/singleitem/collection/press/id/603/rec/1>.

"Cuyahoga River fire, 1952 - Jefferson St. and W. 3<sup>rd</sup>." *The Michael Schwartz Library at Cleveland State University*. Accessed 22 April 2019.

<http://images.ulib.csuohio.edu/cdm/singleitem/collection/press/id/605/rec/8>.

"Donora Zinc Works." *Donora Smog Museum*. Photograph, Donora, PA.

Dickinson, Emily. "By the Sea." *Poetry Foundation*. Accessed 14 April 2019.

<https://www.poetryfoundation.org/poems/50976/i-started-early-took-my-dog-656>.

Dundon, Rian. "Photos: L.A.'s mid-century smog was so bad, people thought it was a gas attack Pollution earned the city the nickname 'Smell-A'." *Timeline*. 23 May 2018. Accessed 26 April 2019. <https://timeline.com/la-smog-pollution-4ca4bc0cc95d>.

Ellis, Paul F. "Scientist Says Better Engines Would Reduce Smog." *Bakersfield Californian* (Bakersfield, CA), 11 March 1949. Accessed 28 March 2019.

<https://www.newspapers.com/image/3288162/?terms=Arie%2BHaagen-Smit>.

Fanucchi, Kenneth J. "San Fernando Revives Plan for Sewage Plant." *Los Angeles Times* (Los Angeles, CA), 9 November 1970. Accessed 31 March 2019.

<https://www.newspapers.com/image/383082786/?terms=clean%2Bwater%2Bact>.

"Fireboat breaking up oil slick on the Cuyahoga River, 1961." *The Michael Schwartz Library at Cleveland State University*. Accessed 22 April 2019.

<http://images.ulib.csuohio.edu/cdm/singleitem/collection/press/id/598/rec/4>.

- Fogg, Susan. "Active Planning Under Way to Save Great Lakes." *The Times Recorder* (Zanesville, OH), 7 January 1972. Accessed 31 March 2019. <https://www.newspapers.com/image/294221827/?terms=clean%2Bwater%2Bact>.
- "Fume Storm Spurs Quest for Remedy." *Los Angeles Times* (Los Angeles, CA), 6 October 1943. Accessed 28 March 2019. <https://www.newspapers.com/image/380793235/#>.
- "Gas mask and Tank," *Donora Smog Museum*. Artifact, Donora, PA.
- "Green/Sustainable Living: Christmas tree made of recycled plastic bottles." *Getty*. Accessed 20 April 2019. <https://www.gettyimages.com/detail/photo/green-sustainable-living-royalty-free-image/725735507>.
- "Guy Stewart Callendar Archive." *University of East Anglia Archive*. Accessed 21 April 2019. <https://portal.uea.ac.uk/library/archives/callendar>.
- Haagen-Smit, A. J. "Chemistry and Physiology of Los Angeles Smog." *Industrial and Engineering Chemistry* 44, no. 6 (1952), 1342-1346. Accessed 21 April 2019. <https://doi.org/10.1021/ie50510a045>.
- Hughes, Langston. "The Negro Speaks of Rivers." *Poets.org*. Accessed 9 February 2019. <https://www.poets.org/poetsorg/poem/negro-speaks-rivers>.
- "In Loving Memory of the 1948 Smog Disaster Victims." *Donora Smog Museum*. Plaque, Donora, PA, 2008.
- "Kansas Has Good Start on Pollution Control." *The Manhattan Mercury* (Manhattan, KS). 25 October 1948. Accessed 31 March 2019. <https://www.newspapers.com/image/423494430/?terms=federal%2Bwater%2Bpollution%2Bcontrol%2Bact>.
- "Koala rescued from deforestation in Australia - big picture." *The Guardian*. 1 May 2013. Accessed 20 April 2019. <https://www.theguardian.com/environment/picture/2013/may/01/koala-rescued-deforestation-australia-big-picture>.
- Leo Correa: *Photojournalist*. Accessed 20 April 2019. <http://leocorrea.net/all-works/>.
- Lester, Liza. "40<sup>th</sup> Anniversary of the Clean Water Act." *Ecological Society of America*. 18 October 2012. Accessed 21 April 2019. <https://www.esa.org/esablog/ecology-in-the-news/ecology-about-town/40th-anniversary-of-the-clean-water-act/>.

- “Letters from Readers Opinions of the People.” *Los Angeles Times* (Los Angeles, CA). 9 December 1946. Accessed 28 March 2019.  
<https://www.newspapers.com/image/380841165/?terms=los%2Bangeles%2Bsmog>.
- Liu, Jianguo “Jack”, Thomas Dietz, Layne Cameron, Sue Nichols , Richard Snider. “ON EARTH DAY, CELEBRATE SILENT SPRING’S 50TH ANNIVERSARY.” *Michigan State University*. Written 20 April 2012. Accessed 22 April 2019.  
<https://msutoday.msu.edu/news/2012/on-earth-day-celebrate-silent-spring/>.
- “Los Angeles’ Smog Drifts Over Valley, Auto Club Survey Shows.” *San Bernardino County Sun* (San Bernardino County, CA), 7 December 1946.  
<https://www.newspapers.com/image/49466209/?terms=los%2Bangeles%2Bsmog#>.
- “Man holding drinking straw from plastic pollution collected on beach, North East England, UK.” *Getty*. Accessed 20 April 2019. <https://www.gettyimages.com/detail/photo/man-holding-drinking-straw-from-plastic-pollution-royalty-free-image/998268474>.
- “Meet Mae West.” *Facebook: STAR Eco Station*. 7 July 2015. Accessed 20 April 2019.  
<https://www.facebook.com/STAREcoStation/posts/meet-mae-west-a-common-snapping-turtle-who-made-the-news-20-years-ago-when-a-you/10153503610929759/>.
- “Marine Debris.” *National Oceanic and Atmospheric Administration*. Accessed 20 April 2019.  
[https://marinedebris.noaa.gov/sites/default/files/GPmap\\_2012\\_NOAAMP.jpg](https://marinedebris.noaa.gov/sites/default/files/GPmap_2012_NOAAMP.jpg).
- Nace, Trevor. “Beijing Declares 'Red Alert' Over Pollution: Haze Visible From Space.” *Forbes*. 9 December 2015. Accessed 21 April 2019.  
<https://www.forbes.com/sites/trevornace/2015/12/09/beijing-declares-red-alert-pollution-haze-visible-space/#4e72e9ed60b7>.
- “Ocean Plastic Pollution.” *Monterey Bay Aquarium*. Accessed 19 March 2019.  
<https://www.montereybayaquarium.org/conservation-and-science/our-priorities/ocean-plastic-pollution>.
- “Oiled Guillimot after Empress oil spill, West Wales.” *Getty*. Accessed 20 April 2019.  
<https://www.gettyimages.com/detail/photo/oiled-guillimot-after-empress-oil-spill-west-wales-royalty-free-image/dv118021>.
- O’Leary, Hilary. “Defenders of Innocence.” In *Wonders: Spectacular Moments in Nature Photography*. San Francisco, CA: Chronicle Books, 2018.
- “Patients In Oxygen-Tented Beds, Donora, Pennsylvania, November 3, 1948.” *Explore PA History*. Accessed 23 April 2019.  
<http://explorepahistory.com/displayimage.php?imgId=1-2-1516>.

“Polluted Air May Cause Cancer, Report on Donora Smog Reveals.” *Pittsburgh Sun-Telegraph* (Pittsburg, PA). 14 October 1949. Accessed 28 March 2019.

<https://www.newspapers.com/image/524997900/?terms=donora%2Bsmog>.

“Protect Your Children Against Disease-Carrying Insects!,” *Science History Institute*. Accessed 22 April 2019. <https://digital.sciencehistory.org/works/mg74qm295>.

“Rachel Carson Papers.” *Yale University Libraries*. Accessed 8 February 2019. <https://beinecke.library.yale.edu/collections/highlights/rachel-carson-papers>.

“Rachel Carson with Microscope.” *Chatham University Collection on Rachel Carson* via *Artstor*. Accessed 22 April 2019. [https://library.artstor.org/#/asset/SS37858\\_37858\\_43400806;prevRouteTS=1553118046503](https://library.artstor.org/#/asset/SS37858_37858_43400806;prevRouteTS=1553118046503).

Richard, Michael Graham. “Guy Callendar's groundbreaking scientific paper on man-made global warming is 75 years old.” *Treehugger*. 23 April 2013. Accessed 21 April 2019. <https://www.treehugger.com/climate-change/guy-callendars-groundbreaking-scientific-paper-man-made-global-warming-75-years-old.html>.

Rubinstein, Rhonda, Sylvia A. Earle, Suzi Eszterhas, and Jonathan Foley. *Wonders: Spectacular Moments in Nature Photography*. San Francisco, CA: Chronicle Books, 2018.

“Ruckelshaus and Nixon signing.” *Donora Smog Museum*. Photograph, Donora, PA, 1970.

“SCIENCE: Experts Sound a Warning- Bug-Bombs Can Be Lethal Too.” *Daily News (New York, NY)*, 19 May 1963. Accessed 28 March 2019, <https://www.newspapers.com/image/458100948/?terms=ddt%2Brachel%2Bcarson#>.

“Senior Mexican Woman Voting: A beautiful senior mexican woman at the voting booth.” *Getty*. Accessed 20 April 2019. <https://www.gettyimages.com/detail/photo/senior-mexican-woman-voting-royalty-free-image/1026684718>.

Seuss, Dr. *The Lorax*. New York: Random House, 2013.

Sassoon, Siegfried. “Arbor Vitae.” *The Path to Peace*. Yorkshire, UK: Stanbrook Abbey Press, 1960.

“(Space) Through all these new imaginative and creative approaches to the porblem ...&quot; [Page from Chapter XVII of *Silent Spring*.] From: Rachel Carson papers.” *Beinecke Rare Books & Manuscript Library*. Accessed 22 April 2019. [https://brbl-dl.library.yale.edu/vufind/Record/3521090?image\\_id=1023491](https://brbl-dl.library.yale.edu/vufind/Record/3521090?image_id=1023491).

Silver, Grace Verne. "Letter to the editor." *Los Angeles Times* (Los Angeles, CA). 23 September 1946. Accessed 28 March 2019.

<https://www.newspapers.com/image/380747096/?terms=los%2Bangeles%2Bsmog#>.

"Smiling young businessman commuting, riding bicycle on sunny urban street." *Getty*. Accessed 20 April 2019. <https://www.gettyimages.com/detail/photo/smiling-young-businessman-commuting-riding-bicycle-royalty-free-image/906503668>.

Smith, Douglas. "Fifty Years of Clearing the Skies." *CalTech*. 25 April 2013. Accessed 21 April 2019. <https://www.caltech.edu/about/news/fifty-years-clearing-skies-39248>.

*Smithsonian: National Museum of Natural History*. Taken 24 March 2019.

"Smithsonian's NMNH." *Twitter*. Accessed 26 April 2019.

[https://twitter.com/NMNH?ref\\_src=twsrc%5Egoogle%7Ctwcamp%5Eserp%7Ctwgr%5Eauthor](https://twitter.com/NMNH?ref_src=twsrc%5Egoogle%7Ctwcamp%5Eserp%7Ctwgr%5Eauthor).

"Smithsonian's NMNH." *Instagram*. Accessed 26 April 2019.

<https://www.instagram.com/smithsoniannmnh/?hl=en>.

"Smithsonian's National Museum of Natural History." *YouTube*. Accessed 26 April 2019.

<https://www.youtube.com/user/smithsonianNMNH>.

"Smithsonian's National Museum of Natural History." *Facebook*. Accessed 26 April 2019.

<https://www.facebook.com/nmnh.fanpage/>.

"Smog in Donora." *Donora Smog Museum*. Photograph, Donora, PA.

"Stainless Steel Straw Set with cleaning brush (4 Pack) Eco Friendly Reusable Drinking Straws." *Green Steel*. Accessed 20 April 2019.

<https://greenssteel.com/collections/accessories/products/stainless-steel-straws>.

"Still life of plastic bottles, source of pollution." *Getty*. Accessed 20 April 2019.

<https://www.gettyimages.com/detail/photo/still-life-of-plastic-bottles-source-of-pollution-royalty-free-image/998263814>.

"Storm Over Fumes Grows (Continued from First Page)." *Los Angeles Times* (Los Angeles, CA). 6 October 1943. Accessed 28 March 2019.

<https://www.newspapers.com/image/380793248/?terms=los%2Bangeles%2Bsmoke#>.

"Svante Arrhenius." *The University of Pennsylvania Libraries: The Edgar Fahs Smith Memorial Collection*. Accessed 21 April 2019.

<http://sceti.library.upenn.edu/sceti/smith/scientist.cfm?PictureID=661&ScientistID=19>.

“This is the U.S. Capitol during the Bicentennial of the Constitution Celebration. There are red, white and blue balloons falling around the Capitol Dome. It marks the dates that commemorate the Centennial 1787-1987.” *Getty*. Accessed 20 April 2019.  
<https://www.gettyimages.com/detail/photo/this-is-the-u-s-capitol-during-the-bicentennial-of-royalty-free-image/73070864>.

Toth, Robert C. “Pollution,” *Los Angeles Times* (Los Angeles, CA) 22 December 1963. Accessed 29 March 2019.  
<https://www.newspapers.com/image/381535754/?terms=clean%2Bair%2Bact>.

“University Archives.” *UCLA Library*. Accessed 26 April 2019.  
<https://www.library.ucla.edu/special-collections/university-archives>.

“U.S. Copyright Office Fair Use Index.” *Copyright.gov*. Accessed 18 May 2019.  
<https://www.copyright.gov/fair-use/index.html>.

Various Authors. “Death at Donora Investigated: Authorities Seek Cause of Disaster (Continued from Page One).” *Pittsburgh Press* (Pittsburgh, PA) 1 November 1948. Accessed 28 March 2019. <https://www.newspapers.com/image/150042145/?terms=donora%2Bsmog>.

“Wave of Change.” *Zak Noyle Photography*. Accessed 20 April 2019.  
<https://www.zaknoyle.com/products/wave-of-change-matted-print>.

Whitman, Walt. *Leaves of Grass: The Original 1855 Edition*. American Renaissance Books, 2009. Kindle.

Zaun, Brenda. “Laysan Albatross – *Phoebastria immutabilis*.” *NatureWorks*. Accessed 27 April 2019.

### Secondary Sources:

“1,500 plastic bottles are used in the U.S. every second – Holey. Moley.” *Green Sheep*. Accessed 25 May 2019. <https://www.greensheepwater.com/plastic-problems>.

“1948 Smog.” *Donora Historical Society*. Accessed 8 February 2019.  
<https://www.sites.google.com/site/donorahistoricalsociety/1948-smog>.

“About the Museum.” *National Museum of Natural History*. Accessed 13 March 2019.  
<https://naturalhistory.si.edu/about>.

“About the Museum: Museum Virtual Tours.” *National Museum of Natural History*. Accessed 14 March 2019. <https://naturalhistory.si.edu/about/virtual-tour>.



“Accessibility Information.” *National Museum of Natural History*. Accessed 14 March 2019.  
<https://naturalhistory.si.edu/visit/accessibility>.

“Account details.” *Newspapers.com*. Accessed 25 May 2019.  
<https://www.newspapers.com/account/>.

Ambrose, Timothy and Crispin Paine. *Museum Basics*, 3rd ed. New York: Routledge, 2012, c1993.

Anderson, Thomas R., Ed Hawkins, and Philip D. Jones. “CO<sub>2</sub>, the greenhouse effect and global warming: from the pioneering work of Arrhenius and Callendar to today’s Earth System Models.” *Endeavour Volume 40, Issue 3*, (2016): 178-187. Accessed 9 February 2019.  
[https://doi.org/10.1016/j.endeavour.2016.07.00\\_](https://doi.org/10.1016/j.endeavour.2016.07.00_)

Associated Press. “Environmental groups want ruling on coal ash water pollution.” *Times Free Press*. 19 April 2019. Accessed 4 May 2019.  
<https://www.timesfreepress.com/news/breakingnews/story/2019/apr/19/environmental-groups-want-ruling-coal-ash-water-pollution/492992/>.

“Betty Klaric.” *OhioLINK Finding Repository*. Accessed 8 February 2019.  
<http://ead.ohiolink.edu/xtf-ead/view?docId=ead/OCIU0068.xml;query=klaric;brand=default>.

Bittel, Jason. “Oil Spills Are Even Worse for Birds than We Thought.” *NRDC*. Written 7 July 2017. Accessed 4 May 2019. <https://www.nrdc.org/onearth/oils-spills-are-even-worse-birds-we-thought>.

Bomboy, Scott. “Dr. Seuss in the land of Fair Use lawsuits.” *Constitution Daily*. Written 4 January 2018. Accessed 26 April 2019. <https://constitutioncenter.org/blog/dr.-seuss-in-the-land-of-fair-use-lawsuits>.

Bratanova, Boyka, Steve Loughnan, and Birgitta Gatersleben. “The Moral Circle as a Common Motivational Cause of Cross-Situational pro-Environmentalism.” *European Journal of Social Psychology* 42, no. 5 (2012): 539-545, <https://doi.org/10.1002/ejsp.1871>.

Brooke, John L. *Climate Change and the Course of Global History: A Rough Journey*. New York: Cambridge University Press, 2014.

Cama, Timothy. “House Dems Scrutinize Trump EPA air pollution policies.” *The Hill*. 28 January 2019. Accessed 30 January 2019. <https://thehill.com/policy/energy-environment/427314-house-dems-scrutinize-trump-epa-air-pollution-policies>.

“Cancer Statistics.” *National Cancer Institute*. Accessed 22 January 2019.  
<https://www.cancer.gov/about-cancer/understanding/statistics>.

- “Coal and Water Pollution.” *Union of Concerned Scientists*. 6 December 2017. Accessed 4 May 2019. <https://www.ucsusa.org/clean-energy/coal-and-other-fossil-fuels/coal-water-pollution#bf-toc-1>.
- “Copyright.” *Getty Images*. Accessed 25 May 2019. <http://wherewestand.gettyimages.com/copyright/#essentials>.
- “Copyright Basics: Libraries and Archives.” *University of Michigan Library*. Accessed 25 May 2019. <https://www.lib.umich.edu/>.
- Crain, Caleb. “Why We Don’t Read- Revisited.” *The New Yorker*. 14 June 2018. Accessed 31 January 2019. <https://www.newyorker.com/culture/cultural-comment/why-we-dont-read-revisited>.
- “Cuyahoga River Fire.” *Ohio History Connection*. Accessed 18 February 2019. [http://www.ohiohistorycentral.org/w/Cuyahoga\\_River\\_Fire](http://www.ohiohistorycentral.org/w/Cuyahoga_River_Fire).
- Davis, Devra. *When Smoke Ran Like Water: Tales of Environmental Deception and the Battle Against Pollution*. New York, NY: Basic Books, 2004.
- “DDT: Environmental Effects.” *University of Delaware*. Updated 19 November 1997. Accessed 3 February 2019. <http://www1.udel.edu/chem/C465/senior/fall97/insecticide/envIRON.html>.
- Denchak, Melissa. “Water Pollution: Everything You Need to Know.” *NRDC*. 14 May 2018. Accessed 4 May 2019. <https://www.nrdc.org/stories/water-pollution-everything-you-need-know#effects>.
- “Department of Education.” *National Museum of Natural History*. Accessed 13 March 2019. <https://naturalhistory.si.edu/education>.
- Dundon, Rian. “Photos: L.A.’s mid-century smog was so bad, people thought it was a gas attack. Pollution earned the city the nickname ‘Smell-A’.” *Timeline*. Written 23 May 2018. Accessed 8 February 2019. <https://timeline.com/la-smog-pollution-4ca4bc0cc95d>.
- Dunlap, W. C., J. Malcolm Shick & Y. Yamamoto. “Sunscreens, oxidative stress and antioxidant functions in marine organisms of the Great Barrier Reef.” *Redox Report: Communications in Free Radical Research*, Vol. 4, 1999. <https://doi.org/10.1179/135100099101535142>.
- “Effective Communication.” *Americans with Disabilities Act*. Accessed 14 March 2019. <https://adata.org/factsheet/communication>.

- Eschner, Kat. "This 1943 'Hellish Cloud' Was the Most Vivid Warning of LA's Smog Problems to Come Southern California—and LA in particular—continue to struggle with smog." *Smithsonian*. 26 July 2017. Accessed 8 February 2019. <https://www.smithsonianmag.com/smart-news/1943-hellish-cloud-was-most-vivid-warning-las-smog-problems-come-180964119/>.
- Fallon, Scott and Russ Zimmer. "One in five residents get contaminated tap water. NJ is ordering companies to clean it up." *NorthJersey.com*. 25 March 2019. Accessed 4 May 2019. <https://www.northjersey.com/story/news/environment/2019/03/25/3-m-dupont-ordered-clean-pfoa-pfos-drinking-water-nj-dow-teflon/3266786002/>.
- "FAQs: Answers to frequently asked questions about donating to the Smithsonian." *Smithsonian*. Accessed 6 April 2019. <https://giving.si.edu/faqs>.
- "Friends of the Smithsonian: Every membership provides the Smithsonian with the philanthropic support we need to thrive." *Smithsonian*. Accessed 6 April 2019. <https://giving.si.edu/membership>.
- Folsom, Ed. "WHITMAN'S MANUSCRIPT DRAFTS OF 'SONG OF MYSELF.'" Leaves of Grass, 1855." *University of Iowa*. Accessed 8 February 2019. <http://bailiwick.lib.uiowa.edu/whitman/index.html>.
- Gardiner, Beth. *Choked: Life and Breath in the Age of Air Pollution*. Chicago, IL: The University of Chicago Press, 2019.
- "Genome I." *National Museum of Natural History*. Accessed 27 April 2019. [https://naturalhistory2.si.edu/vt3/NMNH-DNA/z\\_NMNH-DNA-001.html](https://naturalhistory2.si.edu/vt3/NMNH-DNA/z_NMNH-DNA-001.html).
- Good, Kate. "Dine with the Planet in Mind: Top 10 Eco-Friendly Foods." *One Green Planet*. Written 2014. Accessed 6 April 2019. <https://www.onegreenplanet.org/animalsandnature/top-10-eco-friendly-foods/>.
- Green, Tamara. "15 Eco-Friendly Food Swaps You Need to Make Now." *Food Network Canada*. 12 April 2017. Accessed 6 April 2019. <https://www.foodnetwork.ca/healthy-eating/photos/eco-friendly-food-swaps-earth-day/#!vegan-lasagna>.
- Hayhoe, Katharine. "The Most Important Thing You Can Do to Fight Climate Change: Talk About It." *TED*. November 2018. Accessed 3 February 2019. [https://www.ted.com/talks/katharine\\_hayhoe\\_the\\_most\\_important\\_thing\\_you\\_can\\_do\\_to\\_fight\\_climate\\_change\\_talk\\_about\\_it?language=en](https://www.ted.com/talks/katharine_hayhoe_the_most_important_thing_you_can_do_to_fight_climate_change_talk_about_it?language=en).
- Hays, Samuel P. *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement 1890-1920*. Cambridge, MA: Harvard University Press, 1959, c.1969.

Here & Now Staff. “How the Food Industry Helps Engineer Our Cravings.” *NPR*. 16 December 2015. Accessed 31 January 2019.

<https://www.npr.org/sections/thesalt/2015/12/16/459981099/how-the-food-industry-helps-engineer-our-cravings>.

“Hispanics in the US Fast Facts.” *CNN*. Written 6 March 2019. Accessed 14 March 2019.

<https://www.cnn.com/2013/09/20/us/hispanics-in-the-u-s-/index.html>.

“History of the Clean Water Act.” *Environmental Works*. Accessed 23 February 2019.

<https://www.environmentalworks.com/history-of-the-clean-water-act/>.

“How well do you know the 5 Rs?” *1 Million Women*. 27 November 2015. Accessed 25 May

2019. <https://www.1millionwomen.com.au/blog/the-5-rs-refuse-reduce-reuse-repurpose-recycle/>.

Hughes, J. Donald. *What is Environmental History?*, 2nd ed. Malden, MA: Polity Press, 2016.

Huhtamo, Erkki. “On the Origins of Virtual Museums.” In *Museums in a Digital Age*, edited by Ross Parry. New York, NY: Routledge, 2010.

Hulme, Mike. *Why We Disagree About Climate Change: Understanding Controversy, Inaction, and Opportunity*. New York: Cambridge University Press, 2009. Kindle.

Hunter, Marnie. “World’s 20 Most Popular Museums.” *CNN*. 25 May 2018. Accessed 14 March

2019. <https://www.cnn.com/travel/article/most-popular-museums-world-2017/index.html>.

“Ice Age I,” *National Museum of Natural History*, accessed 27 April 2019,

<https://naturalhistory2.si.edu/vt3/list-3-past.html>.

Irfan, Umair. “It’s not your imagination. Allergy season gets worse every year.” *Vox*. 8 April

2019. Accessed 8 April 2019. <https://www.vox.com/2019/4/8/18300342/pollen-season-2019-allergies-climate-change>.

Jacobs, Chip and William J. Kelly. *The People’s Republic of Chemicals*. Los Angeles, CA: A Genuine Vireo Book/Rare Bird Books, 2014.

Jacobs, Chip and William J. Kelly. *Smogtown: The lung-burning history of pollution in Los Angeles*. New York, NY: The Overlook Press, 2008.

Jacobs, Elizabeth T. PhD, Jefferey L. Burgess, MD, and Mark B. Abbott, PhD. “The Donora Smog Revisited: 70 Years After the Event That Inspired the Clean Air Act.” *American Journal of Public Health* 108 (2018): S85–88.

<https://doi.org/10.2105/AJPH.2017.304219>.

“John McNeill.” *Georgetown University*. Accessed 22 January 2019.

<https://global.georgetown.edu/people/john-mcneill>.

Joy, Mark S. “THE MODERN ERA: Clean Water Act.” *Defining Documents: Environment & Conservation* (1791-2015). April 2016, 134–38.

<http://ezproxy.snhu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=khh&AN=127106083&site=eds-live&scope=site>.

“The Keeling Curve.” Scripps Institution of Oceanography. Accessed 3 February 2019.

<https://scripps.ucsd.edu/programs/keelingcurve/>.

Kolbert, Elizabeth. *Field Notes From a Catastrophe: Man, Nature, and Climate Change*. New York: Bloomsbury, 2006.

Kolbert, Elizabeth. *The Sixth Extinction: An Unnatural History*. New York: Picador, 2014.

Letter to the Editor. “Climate change is a big part of our nation’s border crisis.” *Chicago Sun Times*. 8 April 2019. Accessed 8 April 2019.

<https://chicago.suntimes.com/opinion/climate-change-border-crisis-southern-border-asylum-seekers-migrants/>.

Lieberman, Benjamin and Elizabeth Gordon. *Climate Change in Human History: Prehistory to the Present*. New York: Bloomsbury Academic, 2018. Kindle.

Marsh, George Perkins. *Man and Nature: Or Physical Geography as Modified by Human Actions*. Scotts Valley, CA: CreateSpace Independent Publishing, LLC, 1864, c.2018.

McNeill, J.R. 2003. “Observations on the Nature and Culture of Environmental History.” *History and Theory* 42, no. 4: 5-43. <https://doi.org/10.1046/j.1468-2303.2003.00255.x>.

McNeill, J.R. *Something New Under the Sun*. New York: W.W. Norton & Company Ltd, 2001, c2000.

“Measuring Fair Use: The Four Factors.” *Stanford University Libraries*. Accessed 26 May 2019.

[https://fairuse.stanford.edu/overview/fair-use/four-factors/#the\\_nature\\_of\\_the\\_copyrighted\\_work](https://fairuse.stanford.edu/overview/fair-use/four-factors/#the_nature_of_the_copyrighted_work).

Mitchell, Alanna. *Seasick: Ocean Change and the Extinction of Life on Earth*. Chicago: The University of Chicago Press, 2009.

Nash, Roderick Frazier. *Wilderness and the American Mind*, 5th ed. New Haven, CT: Yale University Press, 1967, c.2014.

- “National Symphony Orchestra,” *National Symphony Orchestra*. Accessed 6 April 2019. <http://www.kennedy-center.org/nso/index>.
- “NCPH CODE OF ETHICS AND PROFESSIONAL CONDUCT.” *National Council on Public History*. Accessed 9 February 2019. <https://ncph.org/about/governance-committees/code-of-ethics-and-professional-conduct/>.
- Nemery, Benoit, Peter H M Hoet, and Abderrahim Nemmar. "The Meuse Valley fog of 1930: an air pollution disaster." *Lancet* 357, no. 9257 (March 3, 2001): 704-708. Accessed 11 February 2017. [https://doi.org/10.1016/S0140-6736\(00\)04135-0](https://doi.org/10.1016/S0140-6736(00)04135-0).
- Nye, Bill. *Unstoppable: Harnessing Science to Change the World*. New York: St. Martin’s Press, 2016.
- Omid, Arash, Hossein Naeemipoor, and Mahdi Hosseini. “Plastic Debris in the Digestive Tract of Sheep and Goats: An Increasing Environmental Contamination in Birjand, Iran.” *Bull Environ Contam Toxicol* 88 (2012):691–694. doi: 10.1007/s00128-012-0587-x.
- O’Neill, James M. “NJ proposes strict new drinking water standards for cancer-linked chemicals.” *NorthJersey.com*. 1 April 2019. Accessed 4 May 2019. <https://www.northjersey.com/story/news/environment/2019/04/01/nj-sets-stringent-drinking-water-standard-cancer-linked-chemicals-pfoa-pfos-pfas/3334281002/>.
- “Outbreak: Epidemics in a Connected World.” *Smithsonian: National Museum of Natural History*. Accessed 10 April 2019. <https://naturalhistory.si.edu/exhibits/outbreak-epidemics-connected-world>.
- Parker, Laura. “HERE'S HOW MUCH PLASTIC TRASH IS LITTERING THE EARTH.” *National Geographic*. 20 December 2018. Accessed 25 May 2019. <https://news.nationalgeographic.com/2017/07/plastic-produced-recycling-waste-ocean-trash-debris-environment/>.
- Parry, Ross, ed. *Museums in a Digital Age*. New York: Routledge, 2010.
- “Past Exhibits Tours: Fossil Lab.” *National Museum of Natural History*. Accessed 14 March 2019. [https://naturalhistory2.si.edu/vt3/NMNH-FH/z\\_NMNH-FH-021.html](https://naturalhistory2.si.edu/vt3/NMNH-FH/z_NMNH-FH-021.html).
- “Permanent Exhibits Virtual Tour.” *National Museum of Natural History*. Accessed 14 March 2019. [https://naturalhistory2.si.edu/vt3/NMNH/z\\_NMNH-016.html](https://naturalhistory2.si.edu/vt3/NMNH/z_NMNH-016.html).
- “Public Engagement.” *Smithsonian*. Accessed 14 March 2019. <https://www.si.edu/dashboard/public-engagement#website-visitors>.
- “Purpose and Vision.” *Smithsonian*. Accessed 13 March 2019. <https://www.si.edu/about/mission>.

- Renz, David O. & Associates. *The Jossey-Bass Handbook of Nonprofit Leadership and Management, Fourth ed.* Hoboken, NJ: John Wiley & Sons, Inc., 2016.
- “Reporting Highlights.” *Chip Jacobs*. Accessed 26 January 2019.  
<http://chipjacobs.com/about/02-reporting-accomplishments/>.
- Revelle, Roger and Hans Suess. “Carbon Dioxide Exchange Between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO<sub>2</sub> During the Past Decades.” *Tellus, volume 1 issue 9* (February 1957): 18-27. Accessed 9 February 2019.  
<https://doi.org/10.1111/j.2153-3490.1957.tb01849.x>.
- Rivers, Matt. “Chinese artist uses ‘vacuum cleaner’ to turn smog into brick.” *CNN*. 8 December 2015. Accessed 14 April 2019. <https://www.cnn.com/2015/12/08/asia/china-pollution-artist/index.html>.
- Ruddiman, William F. *Plows, Plagues, and Petroleum: How humans took control of climate*. Princeton, NJ: Princeton University Press, 2005. Kindle.
- Schmidt, Gavin and Joshua Wolfe. *Climate Change: Picturing the Science*. New York: W. W. Norton & Company, Inc., 2009.
- Schultz, P. Wesley. “Empathizing With Nature: The Effects of Perspective Taking on Concern for Environmental Issues.” *Journal of Social Issues* 56 (3), 2000.: 391–406.  
<http://dx.doi.org/10.1111/0022-4537.00174>.
- “Scientific Staff.” *Smithsonian: National Museum of Natural History*. Accessed 6 April 2019.  
<https://naturalhistory.si.edu/scientific-staff>.
- “Search.” *The Cleveland Memory Project*. Accessed 8 February 2019.  
<http://images.ulib.csuohio.edu/cdm/search/searchterm/cuyahoga%20river%20fires%20disasters/field/all/mode/all/conn/and/order/nosort>.
- Sheppard, Charles. *Coral Reefs: A Very Short Introduction*. Oxford, UK: Oxford University Press, 2014.
- Shrikant, Aditi. “How Museums Are Becoming More Sensory-Friendly For Those With Autism,” *Smithsonian.com*. 5 January 2018. Accessed 13 March 2019. <https://www.smithsonianmag.com/innovation/how-museums-are-becoming-more-sensory-friendly-for-those-with-autism-180967740/>.
- “Smithsonian Affiliations.” *Smithsonian*. Accessed 14 April 2019. <https://affiliations.si.edu/si-edu/>.



“Smithsonian Institution Building.” *Smithsonian*. Accessed 13 March 2019.

<https://www.si.edu/museums/smithsonian-institution-building>.

“Smog.” *Newspapers.com*. Accessed 8 February 2019.

[https://www.newspapers.com/search/#lnd=1&dr\\_year=1948-1948&query=Smog&t=4312&oquery=Smog+1948](https://www.newspapers.com/search/#lnd=1&dr_year=1948-1948&query=Smog&t=4312&oquery=Smog+1948).

Snider, Annie. “Exclusive: Trump EPA won’t limit 2 toxic chemicals in drinking water.” *Politico*. 28 January 2019. Accessed 30 January 2019.

<https://www.politico.com/story/2019/01/28/epa-toxic-chemicals-drinking-water-1124797>.

“Statement on Standards of Professional Conduct (updated 2019).” *American Historical Association*. Accessed 18 February 2019. <https://www.historians.org/jobs-and-professional-development/statements-standards-and-guidelines-of-the-discipline/statement-on-standards-of-professional-conduct#SharedValues>.

St. Thomas, Linda. “The Smithsonian Institution Fact Sheet.” *Smithsonian*. 14 February 2019.

Accessed 6 April 2019. <https://www.si.edu/newsdesk/factsheets/smithsonian-institution-fact-sheet>.

St. Thomas, Linda. “Smithsonian Fiscal Year 2019 Federal Budget Request Totals \$957 Million.” *Smithsonian*. 15 February 2019. Accessed 6 April 2019.

<https://www.si.edu/newsdesk/releases/smithsonian-fiscal-year-2019-federal-budget-request-totals-957-million>.

St. Thomas, Linda. “Smithsonian Fiscal Year 2019 Federal Budget Totals \$1 Billion.”

*Smithsonian*. 26 February 2019. Accessed 6 April 2019.

<https://www.si.edu/newsdesk/releases/smithsonian-fiscal-year-2019-federal-budget-totals-1-billion>.

St. Thomas, Linda. “Smithsonian Fiscal Year 2020 Federal Budget Request Totals \$978 Million.”

*Smithsonian*. 18 March 2019. Accessed 8 April 2019.

<https://www.si.edu/newsdesk/releases/smithsonian-fiscal-year-2020-federal-budget-request-totals-978-million>.

St. Thomas, Linda. “Smithsonian Concludes Capital Campaign With \$1.88 Billion in Private Support.” *Smithsonian*. 6 February 2018. Accessed 6 April 2019.

<https://www.si.edu/newsdesk/releases/smithsonian-concludes-capital-campaign-188-billion-private-support>.

Thoreau, Henry David. *Walden*. Seattle, WA: Amazon Classics, 2017. Kindle.

Tosh, John, ed. *Historians on History*, 2<sup>nd</sup> ed. New York: Routledge, 2013.

Tosh, John. *The Pursuit of History: Aims, Methods and New Directions in the Study of History*, 6th ed. Abington, Oxon: Routledge, 2015.

Trump, Donald. "In the beautiful Midwest, windchill temperatures are reaching minus 60 degrees, the coldest ever recorded. In coming days, expected to get even colder. People can't last outside even for minutes. What the hell is going on with Global Waming? Please come back fast, we need you!" *Twitter*. 28 January 2019. <https://twitter.com/realDonaldTrump/status/1090074254010404864>.

"Update Jan. 2: Smithsonian Statement on Government Shutdown: All Smithsonian Museums and the National Zoo are closed effective Jan. 2." *Smithsonian*. 2 January 2019. Accessed 14 March 2019. <https://www.si.edu/newsdesk/releases/update-jan-2-smithsonian-statement-government-shutdown>.

Van Dooren, Thom. *Flight Ways: Life and Loss at the Edge of Extinction*. New York: Columbia University Press, 2014.

"Visit." *National Museum of Natural History*. Accessed 13 March 2019. <https://naturalhistory.si.edu/visit>.

"Visitor Stats." *Smithsonian*. Accessed 14 March 2019. <https://www.si.edu/newsdesk/about/stats>.

"Welcome." *National Museum of African American History & Culture*. Accessed 14 April 2019. <https://nmaahc.si.edu/>.

Westcott, Ben. "China's greenhouse gas emissions rising, undermining Xi's climate push." *CNN*. 30 January 2019. Accessed 30 January 2019. <https://www.cnn.com/2019/01/30/asia/china-coal-emissions-climate-change-intl/index.html>.

White, Richard. "American Environmental History: The Development of a New Historical Field." *Pacific Historical Review* 54, no. 3 (1985): 297-335. doi:10.2307/3639634.

"Why We Disagree About Climate Change ... top 20 influential books." *Mike Hulme*. Written 11 December 2014. Accessed 3 February 2019. <https://mikehulme.org/why-we-disagree-about-climate-change-top-20-influential-books/>.

"Working at the Smithsonian: Fundraising." *Smithsonian*. Accessed 6 April 2019. [https://www.si.edu/OHR/workingsi\\_fundraising](https://www.si.edu/OHR/workingsi_fundraising).

Worster, Donald, ed. *The Ends of the Earth*. New York: Cambridge University Press, 1988.